Exhibit 1

IN THE UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO

SARA HAWES, on behalf of a class of similarly situated individuals, Plaintiffs, v. MACY'S WEST STORES, INC., Defendant.	Case No.: 17-cv-00754

EXPERT REPORT

OF

STEFAN BOEDEKER

Managing Director, Berkeley Research Group

February 1, 2021

Table of Contents

List of Figures

1 Introduction

1. In this section, I (a) present my qualifications, (b) describe my understanding of the case background, (c) define the scope of my assignment, and (d) describe the materials I considered in forming my opinions.

1.1 Qualifications

2. I am a Statistician and an Economist. I received a Bachelor of Science degree in Statistics and a Bachelor of Arts degree in Business Administration from the University of Dortmund/Germany in 1988. I received a Master of Science degree in Statistics from the University of Dortmund/Germany in 1988, and I received a Master of Arts degree in Economics from the University of California, San Diego in 1992. I also completed Ph.D. requirements (except dissertation) in Economics at the University of California, San Diego.

3. I am a Managing Director at the Berkeley Research Group ("BRG") based at 550 South Hope Street, Suite 2150, Los Angeles, CA, 90071. Prior to joining BRG, I was a Partner at Resolution Economics. I also held Managing Director positions at Alvarez & Marsal, Navigant Consulting, and LECG. I held partner-level positions at Deloitte & Touche LLP, Pricewaterhouse Coopers LLP, and Arthur Andersen LLP. At the three latter firms, I was responsible for the Economic and Statistical Consulting group on the West Coast. Before moving to the United States to attend graduate school, I worked as a statistician for the German Government from 1986 to 1989.

4. For over 25 years, my work has focused on the application of economic, statistical, and financial models to a variety of areas. This includes providing solutions to business problems, supporting complex litigation in a consulting and expert witness role, and conducting economic impact studies in a large variety of industries including, but not limited to, healthcare, retail, grocery, manufacturing, technology, entertainment, manufacturing, automotive, energy and utilities, hospitality, and federal, state, and local government agencies.

5. I have extensive experience designing and conducting surveys and conjoint studies, as well as statistically analyzing results from surveys in both the litigation context as a consultant and/or designated expert and the non-litigation context as a statistical or economic consultant. I

have issued numerous expert and rebuttal reports dealing with surveys, conjoint analysis, and statistical sampling related issues. I have been deposed on numerous occasions and have testified in court regarding surveys, conjoint studies, and statistical sampling-related issues. My work in various cases has been admitted over *Daubert*-related challenges.

6. I do not have an opinion one way or the other about the allegations in this case. Instead, I have relied only on my experience and expertise in designing surveys and conjoint studies and applying economic theory and statistical methodologies based on the assumptions provided herein as to the alleged misrepresentations and/or omissions at issue in this litigation. These assumptions are grounded in the allegations made in the Amended Class Action Complaint, filed October 23, 2018 (the "Complaint")[1], and documents from this case provided to me by Plaintiffs' counsel.

7. All the facts and circumstances set forth in this report are known to me personally and I am prepared to testify to them if called upon to do so. My *curriculum vitae*, which includes matters in which I have testified, is attached to this report as **Exhibit A**. BRG is being compensated for its work on this matter based on an agreed upon hourly billing rate schedule. My hourly billing rate for professional services related to this case is $750 and the hourly billing rates of BRG staff supporting me on this engagement range from $150 to $630. BRG's payment in this matter is not contingent upon my opinions or the outcome of this litigation.

1.2 Case Background

8. The Complaint alleges that Defendant, Macy's, Inc., ("Macy's" or "Defendant"), marketed certain bed sheets representing to have greater than their true thread counts.[2] The Complaint further alleges that this misrepresentation deceived and misled consumers into believing that they were purchasing a product with the represented thread count and a product of higher quality, durability, longevity and softness than they actually received.

---

[1] Third Amended Class Action Complaint, Hawes et al. v. Macy's, Inc., United States District Court For The Southern District Of Ohio, Case No. 1:17-cv-00754, filed August 12, 2019.

[2] Complaint, ¶4.

1.3 Assignment

11. I was retained by counsel for the Plaintiffs to:

a. Ascertain if it is possible to quantify economic losses to consumers, including Plaintiffs and the Class, attributable to the purchase of a product advertised with misrepresentations, and if so, to provide a framework for the computation of class-wide damages. In particular, I was retained to ascertain or determine if it is possible to use an economic loss model to quantify the damages suffered by the Plaintiffs and the Class as a result of the misleading and/or false representations or statements pertaining to the thread count on the labels of the products.Explain and outline an economic model that enables the quantification of economic losses suffered by Plaintiffs and the Class, as a result of having purchased a product that is other than as represented by Defendants.

b. Explain and outline an empirical study to quantify the economic loss to consumers, by assessing consumers' changes in choices and preferences if the misrepresentations were disclosed at the point of purchase.

c. Explain and outline a statistical methodology to calculate class-wide damages utilizing transactional purchase data that enable the valuation of the attributes that a product is comprised of.

1.4 Materials Considered

9. In forming my opinions for this report, I have considered the documents listed in **Exhibit B** to this report and all materials cited in the text and footnotes of this report.

1.5 Report Outline

10. The remainder of this Expert Report is structured as follows:

a. Section 2 describes the background to my report, including an overview of the Plaintiffs' allegations and the products at issue.

b. Section 3 presents the theoretical framework of the economic loss model based on consideration of supply and demand.

c. Section 4 discusses hedonic pricing model and conjoint analysis as methodologies to quantify the impact of changing market conditions on consumer demand.

d. Section 5 concludes that the results from a properly designed and implemented conjoint study can reliably quantify class-wide economic losses.

2 Background

11. In the following I describe my understanding of the claims against Defendant and the products at issue.

2.1 Claims Against Defendants

12. According to the Amended Complaint and case materials, the represented thread count on the product label was overstated or inflated because individual fibers were counted within a yarn.

13. The thread count is an important driver of quality of textile products and hence advertised on many bedding and linen products. Ceteris paribus, a higher thread count is associated with a better quality and a higher price.

14. ASTM International's standard D3775-17e1 "covers the measurement of warp end count and filling pick count and is applicable to all types of woven fabrics."[3] Per ASTM International, the threat count measures "[t]he number of warp yarns (ends) per unit distance and filling yarns (picks) per unit distance."[4]

15. "Labeling these products based on a count that includes each ply in plied yarns deceives the customer into believing that bedding products with higher counts are better when, in fact, they might be inferior because of the method used to determine the count."[5]

[3] ASTM D3775-17e1, Standard Test Method for End (Warp) and Pick (Filling) Count of Woven Fabrics, ASTM International, West Conshohocken, PA, 2017, ¶1.1.

[4] ASTM International, D3775-17e1, para 4.1.

[5] Exhibit C to Complaint, ATMI letter from January 31, 2002.

16. The FTC was alerted to different ways calculating Thread Count by Carlos Moore of the American Textile Manufacturers Institute.[6] In response, Elaine D. Kolish, the assistant director for enforcement, wrote:

> *A thread count claim, like other objective, material claims about a product, must be supported by a "reasonable basis." In determining what constitutes a reasonable basis for claims, we would consider what experts in the field believe is appropriate, including whether there are relevant consensus based test procedures, such as an ASTM test procedure, or other widely accepted industry practices that apply to the matter. If so, we would give such procedures or practices great weight in determining whether: the advertiser has met its substantiation burden. In other related contexts, the Commission has encouraged the use of ASTM tests.*[7]

Three years later, James Kohm, assistant director for enforcement in the FTC's Enforcement Bureau of Consumer Protection wrote on the issue of thread counts:

> *Based upon the ASTM standard, as well as the information you have provided about standard industry practices with regard to disclosing thread count, we believe that consumers could be deceived or misled by the practice of stating an inflated thread count, achieved by multiplying the actual count by the number of plies within the yarn. A possible non-deceptive way to disclose both the thread count and the yarn ply would be to state, for example: "300 thread count, 2 ply yam." A representation of"600 thread count" for this same product would likely mislead consumers about the quality of the product being purchased.*[8]

---

6 Letter from Carlos Moore (Executive VP) of American Textile Manufacturers Institute, addressed to Steve Ecklund regarding: Request for FTC Staff Opinion on Yarn Count. Dated 01/31/2002.

7 Letter from Elaine D. Kolish (Ass. Dir. For Enforcement) of Division of Enforcement Bureau of Consumer Protection, addressed to Carlos Moore regarding: Request for FTC Staff Opinion Concerning Thread Count. Dated 03/18/2002.

8 Letter from James Kohm (Ass. Dir. For Enforcement, division of Enforcement Bureau of Consumer Protection) regarding: Linwood Wright's requesting a Commission staff opinion regarding the appropriate way

2.2 Products at Issue

17. The products at issue (the "Products") are defined as bed sheets manufactured or supplied by AQ Textiles and/or Creative Textiles sold by Macy's and that was packaged or advertised with a representation regarding thread count.[9]

2.3 Proposed Classes

18. Plaintiffs seek to represent the following Class: "Each person in California who purchased from Macy's a CVC (cotton-polyester blend) sheet supplied by AQ Textiles since November 8, 2013.

3 Theoretical Framework of Economic Loss

19. I understand that the legal theory to assess if the Plaintiffs and the Class suffered an economic loss in this matter is the difference between actual value of the Product at time of purchase with the inflated thread count and the value of the Product if they had been as represented with the true thread count.[10]

20. As described in *Comcast*, the first step in a damages study is the translation of the legal theory of the harmful event into an analysis of the economic impact of that event.[11] Hence, in the following I first describe the economic framework to be utilized to estimate damages in this case.

21. The *Reference Guide on Estimation of Economic Damages* (the "Reference Guide")[12] describes the framework in which the damage to the plaintiff(s) is considered by comparing the actual world (the "Actual World") to a hypothetical "but-for" world (the "But-For-World). Hence,

---

to disclose fabric "thread count" on labels or in advertising for household textile products such as bed sheets. Dated 08/02/2005.

9 Third Amended Complaint, ¶51.

10 Third Amended Complaint, ¶71.

11 *Comcast Corp. V. Behrend*. Supreme Court of the United States, p. 3.

12 Allen, Hall and Lazear. (2011). Reference Guide on Estimation of Economic Damages. *Reference manual on scientific evidence*. The *Reference Manual on Scientific Evidence* assists judges in managing cases involving complex scientific and technical evidence by describing the basic tenets of key scientific fields. The Reference Manual is published by the Federal Judicial Center, the research and education agency of the judicial branch of the U.S. government.

defining the But-For-World is key to estimating damages in cases that require the measure of a difference in value of a product relative to the price that was paid and the value that was received.

> *Because the but-for scenario differs from what actually happened only with respect to the harmful act, damages measured in this way isolate the loss of value caused by the harmful act and exclude any change in the plaintiff's value arising from other sources. Thus, a proper construction of the but-for scenario and measurement of the hypothetical but-for plaintiff's value by definition includes in damages only the loss caused by the harmful act.*[13]

22. For the remainder of this Report, I define the But-For-World to be the hypothetical world, where those who purchased bedding or linen products from Defendant had been informed at the point of purchase that the thread count on the product's packaging was misrepresented. I analyze the But-For-World in comparison with the Actual-World, which is the state of the world where consumers purchased the product with the expectation of a thread count as advertised. This is the world where actual transactions occurred, and prices and quantities sold of the at-issue products are available.

3.1 Economic Framework

23. In developing the economic framework, I consider a producer, who maximizes profits Π:[14]

[Eq. 1] $$\max[\ \Pi = p*D(p) - C(D(p))\ ]$$

where p is the market price, D(p) is the residual demand[15] at the market price p, and C(D(p)) is the cost function of the producer.

---

[13] Allen, Hall and Lazear. (2011). Reference Guide on Estimation of Economic Damages. *Reference manual on scientific evidence*, p. 432.

[14] The following derivation is loosely based on Tirole. (1988). *The Theory of Industrial Organization*: MIT press, p. 68.

[15] The residual demand curve is defined as the individual producer's demand curve, which is that portion of market demand that is not supplied by other producers in the market. In other words, the residual demand function is the market demand function minus the quantity supplied by other producers at each price. See, e.g., Varian. (2010). *Intermediate Microeconomics: Modern Approach* (8th ed.), pp. 504-506.

24. Based on the product rule and the chain rule for derivatives, the derivative of the profit function Π with respect to p is given by D(p) + D'(p) - C'(D(p)) * D'(p), and thus the First Order Condition to find the maximum profit can be written as:

$$[\text{Eq. 2}] \qquad D(p) + D'(p)*(p - C'(D(p)) = 0,$$

where D' and C' denote the first derivatives of the demand function D and the cost function, C respectively.

25. Based on this First Order Condition, the price $\mathcal{P}$ and the volume $\mathcal{D}$ in the market equilibrium of the Actual World can be determined. This market equilibrium can also be observed in the market if information on market volumes and prices is available.

26. Next, I will frame the appropriate But-For-World. If consumers perceive the product without the claim to be inferior to the product with the claim, then the demand at a given price will be lower:[16]

$$[\text{Eq. 3}] \qquad D_{\text{But-For}}(P) < D_{\text{Actual}}(P)$$

27. The Reference Guide on Estimation of Economic Damages asks to "isolate the loss of value caused by the harmful act and exclude any change in the plaintiff's value arising from other sources."[17] This means that a new price P^* has to be found in the But-For-World such that the demand in the But-For-World equals the demand in the actual market equilibrium where $\mathcal{D}$ and $\mathcal{P}$ represent the Actual World equilibrium demand and price, respectively:

$$[\text{Eq. 4}] \qquad D_{\text{But-For}}(P^*) = \mathcal{D}$$

28. Again, if consumers perceive the product without the claim to be inferior to the product with the claim, then P* will be smaller than $\mathcal{P}$. The price difference $\Delta = \mathcal{P} - P^*$ is the "price

[16] Later in this Report, I will introduce the survey-based methodology of Choice Based Conjoint analysis as an empirical test to assess if the knowledge of the fact that a statement is misleading will lower the demand for the product.

[17] Allen, Hall and Lazear. (2011). Reference Guide on Estimation of Economic Damages. *Reference manual on scientific evidence*, p. 432.

premium" that the consumer would pay for the product if the statements were true. Δ is the compensation to the consumers who paid $\mathcal{P}$ in the Actual World under the assumption that the statements on the label were true.

29. The price-premium Δ can also be described as the Pigouvian[18] subsidy that increases consumption of the product in the But-For-World to the volume $\mathcal{D}$ of the Actual-World market equilibrium.

30. The manufacturer's profit function in the But-For-World, which includes the compensation to be paid to the consumers $\Delta^* D_{But\text{-}For}(P^*)$ can be written as:

$$[\text{Eq. 5}] \qquad \Pi = p^* D_{But\text{-}For}(p) - C(D_{But\text{-}For}(p)) - \Delta * D_{But\text{-}For}(p)$$

31. Note, that the cost function C(.) is the same in the But-For-World and in the Actual World, while the volume to which the cost function applies in the But-For-World may differ from the volume in the Actual World. The First Order Condition for the producer's profit maximization is in the But-For-World is given by:

$$[\text{Eq. 6}] \qquad D_{But\text{-}For}(p) + D'(p) * (p - C') = 0$$

32. The First Order Condition in the But-For-World is different from the First Order Condition in the Actual-World. In the But-For-World, the manufacturer faces a lower demand and – if it could - would set a different price which maximizes profits. Therefore, the manufacturer would achieve a different volume in the But-For-World.

33. However, setting new profit-maximizing prices and volumes sold would contradict the postulate of the Reference Guide that the But-For-World should only correct for the harmful act. Allowing the profit-maximizing producer to change the product's volume sold after disclosing the mislabeling in the But-For-World would lead to a lower equilibrium volume in the But-For-World than in the Actual-World. The manufacturer's profit is irrelevant in false advertising cases, where only the value perceived versus the value received by consumers must be considered.[19]

---

[18] Pigou. (1929). *The Economics of Welfare* (3rd ed.): Routledge.

[19] Note, that in patent infringement cases, and depending on the perspective, the profit of the patent holder or the profit of the patent infringer are the relevant variable to be analyzed in the But-For-World. See Allenby, Rossi,

Hence, there is no need for information on the cost structure of the manufacturer or the shape of its supply function.

34. All solving [Eq. 4] requires is information on the shape of the But-For demand curve in the But-For-World.

35. In this case, the number of bedding or linen products that Defendant would have sold if in the But-For-World is the same, as in the Actual World because the Reference Guide requires the expert to assume that "*the but-for scenario differs from what actually happened only with respect to the harmful act, damages measured in this way isolate the loss of value caused by the harmful act and exclude any change in the plaintiff's value arising from other sources*."[20]

36. I interpret the Reference Guide to require that I do not consider changes to the supply and that I consider that the supplied volume is the same in the But-For-World as in the Actual-World. Or in other words, the supplied volume in the But-For-World cannot deviate from the supplied volume in the Actual World. Hence, the supply is fixed at the number of units sold in the Actual-World.

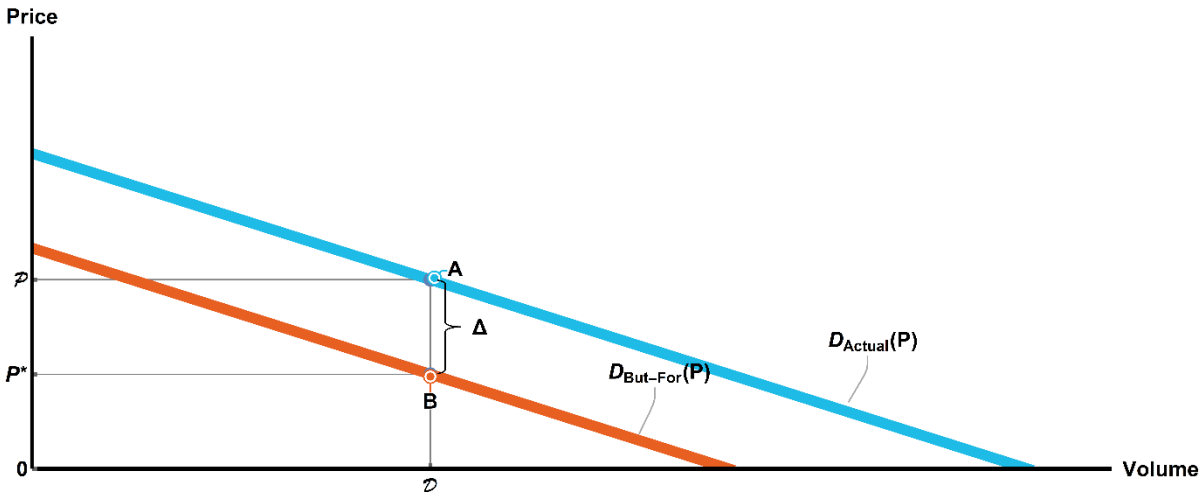
37. Figure 1 presents this analysis graphically: Point A in Figure 1 is the market equilibrium in the actual world with the equilibrium price P^* and the equilibrium volume D^* on the Actual-World demand curve. The But-For demand curve is below the Actual-World demand curve as the disclosure at the point and time of purchase makes the product less attractive to consumers. Hence, for a given volume, consumers are willing to pay a lower price in the But-For-World with disclosure than in the Actual-World without disclosure. To fully compensate all purchasers for their economic losses, it is necessary to find the price point on the But-For-World's demand curve that ensures that the same number of units that were sold in the Actual-World would also be sold in the But-For-World. We move along the But-For demand curve (orange demand curve in Figure 1 below) until the volume sold is equal to the volume sold in the Actual-World (D* in Figure 1

Cameron, Verlinda and Li. (2017). Calculating Reasonable Royalty Damages Using Conjoint Analysis. *American Intellectual. Property Law Association Quarterly Journal, 45*(2), 233-254. and Cameron, Cragg and McFadden. (2013). *The Role of Conjoint Surveys in Reasonable Royalty Cases*. Law 360. However, patent litigation builds on a different underling legal framework than false advertising cases. Therefore, applying the same economic analysis as in patent cases would not be appropriate in false advertising cases.

[20] Allen, Hall and Lazear. (2011). Reference Guide on Estimation of Economic Damages. *Reference manual on scientific evidence*, p. 432.

below). Point B on the But-For demand curve gives us the price at which purchasers would have purchased the volume D* in the But-For-World knowing at the time and place of purchase that the manufacturer's claim was false. The vertical distance Δ between points A and B is equal to the compensation required to make all purchasers whole.

Figure 1: Shifted Demand and Economic Loss



Source: Illustrative Example

38. In my economic loss model, the But-For demand curve will be empirically determined based on a survey Choice Based Conjoint ("CBC") analysis, which I will discuss in detail in the next Section.

3.2 An Application of the Economic Framework to False Advertising Cases

39. I will now apply the economic framework explained above to an illustrative example related to false and misleading advertisements.

40. Let us assume the following:

a. XYZ, Inc. sells 1,000 units of Product A for $50 claiming that Product A has Attribute X.

b. Attribute X is a desirable attribute.

c. Consumers view Product A with Attribute X as superior to an otherwise identical product without Attribute X.

d. The resulting market price for Product A with Attribute X is higher than the market price for an identical product without Attribute X, or in other words, the demand curve for the product without Attribute X is below the demand curve for the product with Attribute X.

e. XYZ, Inc. advertised its Product A as having the desirable attribute X without disclosing to the consumers that Product A does not have Attribute X.

f. At some point, knowledge becomes available to the market that XYZ, Inc's Product A does not have and never has had the desirable Attribute X.

g. Subsequently, a consumer class action is filed alleging that XYZ, Inc. falsely claimed that Product A has Attribute X.

h. The Plaintiffs in the class action lawsuit claim that they would not have paid $50 for Product A had they known at the point of purchase that the product does not have Attribute X as claimed by XYZ, Inc.

i. As a result of their false and misleading advertising of Product A, XYZ, Inc. has increased its revenue and profits at the expense of the consumers who paid $50 for Product A thinking that it has Attribute X. At issue in the consumer class action are the 1,000 units of Product A that were sold before it was disclosed that Product A does not have Attribute X.

41. In the following paragraphs, I will refer to the situation where 1,000 consumers bought Product A for $50 expecting that it has Attribute X as advertised as the "Actual-World." In contrast, I will refer to the situation where the consumers are informed at the point of purchase that Product A does not have Attribute X as the "But-For-World."

3.2.1 Modeling the "But-For-World"

42. Following the above cited reasoning in the Reference Guide[21], the Actual-World is the world where XYZ, Inc. (now the Defendants in the class action lawsuit) concealed the fact that Product A does not have Attribute X, and where XYZ, Inc. sold 1,000 units at $50; while the But-For-World is the hypothetical world where the Defendants would have disclosed the truth (i.e., Product A does not have Attribute X) to consumers at the point of purchase.

43. If the 1,000 consumers who purchased Product A in the belief that Product A has Attribute X view Product A without Attribute X as inferior, then their demand for Product A without Attribute X will shift downward resulting in lower volumes sold at lower prices. If the market price for Product A without Attribute X is lower than $50 after the disclosure that Product A does not have Attribute X, then everyone of the 1,000 consumers who bought Product A in the Actual-World with the belief that it has the desirable Attribute X at $50 will have overpaid, and thus suffered an economic loss.

44. To properly assess the economic loss to the consumers, one must quantify how consumers would have valued Product A had they known at the point of purchase that Product A does not have Attribute X. The economic loss is determined as the difference between what consumers paid in the Actual-World (i.e., $50) assuming that Product A has Attribute X and the value consumers received from having purchased Product A without Attribute X for a volume of 1,000 units of Product A.

45. To determine the economic loss, one needs to estimate the demand curve in the hypothetical But-For-World. If the demand curve in the But-For-World shifts downward because Product A without Attribute X is less desirable then the shift of the demand curve would result in a lower market price and/or a lower transaction volume in the But-For-World. In other words, Defendants' misrepresentation in the Actual-World about Product A having Attribute X, may have induced more consumers to purchase Product A at a higher price. Therefore, the relevant measure for the economic loss is the downward shift in demand in the But-For-World evaluated at the quantity sold in the Actual-World.

---

[21] See Footnote 12.

3.2.2 Determination of Economic Loss

46. To determine how much the demand curve would shift when it is revealed that Product A does not have Attribute X, the price paid in the Actual-World has to be compared to the price the consumers would have paid for Product A without Attribute X in the But-For-World.

47. For example, if the price point for selling 1,000 units in the Actual-World is $50 and the price point for selling 1,000 units in the But-For-World is $30, then difference of $20 is the amount that will compensate each consumer for the amount they overpaid for a unit of Product A, as a result of Defendants' concealment of the fact that Product A does not have Attribute X.

48. Each consumer who bought Product A with the understanding that it has Attribute X in the Actual-World has to be made whole because they overpaid for the product. Total damages for those consumers equal the per unit price difference of Product A sold in the Actual-World (Product A has Attribute X) and in the But-For-World (Product A does not have Attribute X) multiplied by the total number of units of Product A purchased by consumers in the Actual-World.

49. The approach to estimating class-wide economic damages introduced in this Section appropriately focuses on the single class-wide compensation that would be required to clear the market if the misrepresentations had been disclosed to members of the putative class at the point of purchase.

50. The class-wide economic loss is the product of this compensation and the number of units sold by Defendants in the Actual-World.

3.3 Consideration of the Supply Side in the But-For-World

51. In the But-For-World, the consumers know at the point of purchase that Product A does not have Attribute X, which makes Product A less desirable to them. Consequently, they would pay a lower price for the product in the But-For-World. Consumers who bought in the Actual-World assuming that Product A does have Attribute X thus overpaid, and need to be compensated for the loss of utility they experienced from not getting Product A with Attribute X. This can only be achieved by determining the reduced price at which 1,000 consumers would have purchased in the But-For-World, and providing purchasers with a compensation that effectively shifts the But-For demand curve into the market equilibrium volume of the Actual World.

52. The shape of the supply curve(s) in the Actual-World and in the But-For-World is irrelevant for the quantification of economic damages because the focus is to determine a price in the But-For-World for the units sold in the Actual-World. In other words, the focus is on the same volume point on the two demand curves. In both the Actual-World and the But-For-World, the Defendants will incur the same marginal costs for producing and selling Product A. Moreover, in the But-For-World, Product A will simply no longer be sold as having Attribute X, and therefore, the But-For-World is defined as differing from the Actual-World only by virtue of the disclosure that Product A does not have Attribute X.

53. If the demand curve shifts downward in the But-For-World after disclosing that Product A does not have Attribute X, then all consumers who bought Product A in the Actual-World overpaid, and therefore, the 1,000 units of Product A sold in the Actual-World are pertinent to the computation of Class-wide damages.

54. In this case, I propose to incorporate the supply side in the Actual World by incorporating attributes of the at-issue products like the size (Twin, Queen, King), the weaving style (percale/sateen/flannel), the origin of the cotton (Egypt, Turkey, United States, etc.), and the type of cotton (extra-long staple (ELS), long-staple pima (Supima), long-staple Egyptian) . I propose to further analyze market prices that were paid by consumers in the Actual World. Lastly, I propose to utilize the quantities sold of the at-issue products during the class period, thus reflecting the supply in the Actual World.

4 Approaches to Estimating the Value of Individual Attributes in Composite Products

55. Based on Comcast Corp. v. Behrend, 569 U.S. 27 (2014), "a damage model purporting to serve as evidence of damages in [a] class action must measure only those damages attributable to that theory".[22]

56. There is no market for a product called "thread count". While we could ask consumers directly how much compensation they require to make them whole at the point and place of

[22] *Comcast*. (2014). U.S. Supreme Court, p. 35.

purchase, the direct questioning is likely to lead to strategic responses, which could inflate the economic loss estimates.

57. In the following two sections, I describe first the application of a hedonic pricing approach and second a conjoint analysis to estimate the potential economic loss to purchasers of Macy's affected products.

4.1 Hedonic Pricing Approach

58. The Hedonic Pricing Approach is part of the category of "Revealed Preference" based approaches where one observes actual purchases by consumers or published prices and infer from that information the decomposition of the overall price of the composite product into its constituent components. The Hedonic Pricing Approach accomplishes this by using regression analysis[23] where the actual transaction prices of the composite product with varying attributes are regressed on the specifications of the composite product. The regression coefficients are then interpreted as the implicit market prices of each attribute.

59. The hedonic pricing approach builds on a theoretic foundation established by Andrew Court[24] in 1939 and expanded by Zvi Griliches,[25] [26] Sherwin Rosen,[27] Jack Triplett,[28] [29] Robert

---

[23] Wooldridge. *Introductory Econometrics: A Modern Approach*: Nelson Education.

[24] Court, Andrew T. (1939), "Hedonic Price Indexes with Automotive Examples", in: The Dynamics of Automobile Demand, New York, NY: General Motors Corporation, pp. 99-117.

[25] Griliches, Zvi (1961), "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change", in: Price Statistics Review Committee, National Bureau of Economic Research, The Price Statistics of the Federal Government: Review, Appraisal, and Recommendations, General Series No. 73. New York, NY: National Bureau of Economic Research, pp. 173-96, reprinted in Zvi Griliches, Technology, Education, and Productivity, Oxford: Basil Blackwell, 1988, pp. 76-104.

[26] Griliches, Zvi (1990), "Hedonic Price Indexes and the Measurement of Capital and Productivity: Some Historical References", in: Ernst R. Berndt and Jack E. Triplett (eds.), Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth, National Bureau of Economic Research Studies in Income and Wealth, Vol. 54. Chicago: University of Chicago Press, pp. 185-202.

[27] Rosen, Sherwin (1974), "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition", Journal of Political Economy, 82(1) (January-February), pp. 34-55.

[28] Triplett, Jack E. (1969), "Automobiles and Hedonic Quality Measurement", Journal of Political Economy, 77(3) (May-June), pp. 408-17.

[29] Triplett, Jack (2006), Handbook on Hedonic Indexes and Quality Adjustments in Price Indexes: Special Application to Information Technology Products, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/9789264028159-en

Feenstra,[30] and many others. Since then the hedonic pricing approach has for example been used by the Bureau of Labor Statistics to compute price indices for personal computers and television sets.[31] The hedonic pricing approach has been accepted by courts in false advertising cases.[32] I also previously applied the Hedonic Pricing Approach to estimate economic damages in a false advertising case.[33]

60. The proper use of hedonic pricing models requires the ability to observe all attributes of the composite good and the variation in each attribute. For example, if all bed sheets were sold with the same thread count, then hedonic pricing models cannot be used to estimate the implicit price of 300 versus 600 thread counts. The market for bed sheets lends itself to the application of the hedonic pricing approach because there are multiple products sold at different thread counts. This allows computing an implicit price of thread count using hedonic pricing analysis.

4.1.1 Methodology

61. The Hedonic Pricing Approach takes into account demand and supply in the market under consideration.

62. On the demand side, we assume a utility function as first described by Lancaster, in which the utility derived from a certain product is a function of its attributes.[34] When consumers can choose the level of each attribute they will consume more of a specific attribute until the marginal utility equals the marginal increase in the price of the product. In this case, the attribute of interest is the thread count of bed sheets marketed and sold by Macy's and its competitors. The levels of the attribute are the typical range of advertised thread counts.

63. The analysis needs to include other relevant attributes that affect price. However, attributes that do not vary between products can be omitted from the regression even if they add

---

30 Feenstra, Robert C. (1995), "Exact Hedonic Price Indexes", Review of Economics and Statistics, 77(4) (November), pp. 634-53.

31 Pakes. A Reconsideration of Hedonic Price Indexes with an Application to Pc's. *American economic review, 93*(5), 1578-1596, p. 1.

32 [Kurtz v. Costco]

33 In Re: Emerson Electric Co. Wet/Dry Vac Marketing and Sales Practices Litigation (4:12-md-02382).

34 Lancaster. (1966). A New Approach to Consumer Theory. *Journal of political Economy, 74*(2), 132-157.

to the cost of the product. For example, the number of wheels would not need to be included in a hedonic analysis of car prices because there will be no variation in the number of wheels between the cars in the dataset. Another issue could arise if the attribute of interest is correlated with another attribute (multicollinearity). For example, higher thread counts could be correlated with a specific color. If this color is valuable, we would not be able to distinguish between the implicit price attributable to the color of the bedsheets and the implicit price of the thread count. I will apply statistical tests to determine whether omitted variables or multicollinearity are of issue in my analysis.

64. On the supply side, we assume that the production cost function is also dependent on the various attributes. Under perfect competition, the manufacturer will increase the level of each attribute until the marginal cost of the attribute is equal to the marginal increase in price that the manufacturer can achieve in the market.

65. In a market equilibrium with perfect competition, the marginal cost of the attribute is equal to the marginal utility and the implicit price of the attribute. I use this relationship to extract the implicit price of a specific attribute from observable market prices and attributes. The implicit price of the attribute is equal to the partial derivative of the hedonic price function to the attribute.

66. A hedonic equation will be specified correlating the price of the product to its attributes and features. Using regression analysis, this equation can be estimated empirically where the observed price of the composite product is a function of the vector of the descriptive attributes and the implicit price vector.

67. Bed sheets are a relatively homogenous product with few distinguishing features. Many manufacturers supply many online and brick-and-mortar retailers. Barriers to entry are to be small as the technology for bed sheets is long established. Hence, I believe that the market for bed sheets is competitive and manufacturers and retailers are not likely to have much market power. Nevertheless, academic research has demonstrated that the assumption of perfect competition can

be relaxed and that other forms of competition can be considered in the analysis without compromising the hedonic pricing approach. [35] [36] [37] [38]

68. Researchers typically distinguish between a linear, semi-log and log-log approach. In the linear approach, the coefficient of the attribute in the regression equation is equal to the change in market price of the composite product due to a change in the attribute level by one unit. In the log-log approach, the coefficient of the attribute in the regression equation can be interpreted as an elasticity. The percentage change in the price of the composite product is equal to the percentage change in the level of the attribute. Researchers often choose the log-log approach when the marginal utility or the marginal cost of production change with the level of the attribute.

69. The Hedonic Pricing Approach originally relied on standard linear regression analysis. In the recent past, other approaches, like Bayesian regressions have also been developed.[39]

4.1.2 Dataset and Variables

70. In previous cases, I have relied on scanner data compiled by IRi or Nielsen to establish how many units of a given product specified as a Stock Keeping Unit ("SKU") were sold in a specific region and specific timeframe. Unfortunately, IRi and Nielsen do not compile scanner data on bed sheets.

71. Through discovery, I received data on Macy's sales of bed sheet products by SKU.[40] I determined that Macy's has sold a large variety of bedsheets.

---

[35] Berry. Estimating Discrete-Choice Models of Product Differentiation. *The RAND Journal of Economics*, 242-262.

[36] Feenstra. *Exact Hedonic Price Indexes*. National Bureau of Economic Research.

[37] Berry, Levinsohn and Pakes. Automobile Prices in Market Equilibrium. *The Econometrica Society, 63*(4), 841-890.

[38] Nesheim. Hedonic Price Functions. *CEMMAP, London*.

[39] Garay, Puggioni, Molina and ter Horst. A Bayesian Dynamic Hedonic Regression Model for Art Prices. *Available at SSRN 3322843*.

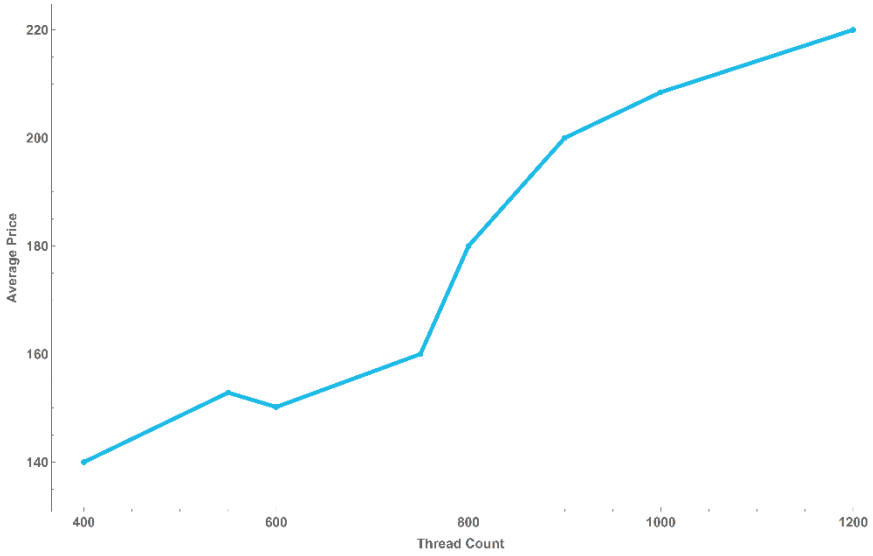
[40] MACYS_0000902-914.xlsx.

72. In addition to sales volumes and sales revenues, I received through discovery data on relevant product attributes of bed sheets sold at Macy's.[41] [42] These datasets include information on the price, the thread count, the size (Twin, Queen, King), the weaving style (percale/sateen/flannel), origin of the cotton (Egypt, Turkey, United States, etc.), the number of sets included, the fabric content, and other features and benefits.

73. The three datasets can be combined by applying the UPC code as a key across the three datasets. Therefore, it is my opinion that the information currently available on sales of products sold at Macy's is already sufficient to compile a dataset that provides a reliable source for an analysis using the hedonic pricing approach.

74. A preliminary analysis of these data indicates that bedsheets with higher advertised thread counts are priced higher. Figure 2 shows the price for 180 UPC for King sized bedsheets, for which the ticket price was available. UPCs with identified Sateen weaves are excluded from this analysis. In general terms, and without controlling for other attributes that could influence price, the higher the thread count, the higher prices are.

Figure 2: Relationship Between Price and Thread Count for King Sized Sheets Sold By Macy's



41 MACYS_374-391 combined item spreadsheet.xlsx.

42 Recreated MWSI Sheets Spreadsheet.xlsx

Source: Recreated MWSI Sheets Spreadsheet.xlsx

75. Combining the datasets, I will calculate the weighted average sales price by dividing total revenue across all sales channels by the units sold across all sales channels.

76. I will then test different model specifications to determine whether there is a positive and significant functional relationship between the thread count and price, while keeping all other variables constant. This method will enable me to determine the implicit price per unit of thread count.

77. I will consider a regression equation where *Price* is a function of *Thread Count* and certain attributes, like, for example, Weave, Size, Origin:

$$Price = f(Thread\ Count, Weave, Size, Origin)$$

78. With this regression function I can then determine the difference in market price between different thread counts while keeping all other variables constant to determine the economic loss to consumers due to Defendants withholding at the time and place of purchase that the thread count of certain bed sheet products was lower than Defendants claimed in their advertising and stated in the product descriptions consumers relied on in their purchases.

4.2 Conjoint Analysis

79. In this section, I describe Choice-Based Conjoint ("CBC") analysis with subsequent market simulations which is a reliable methodology to test empirically whether the disclosure that a particular statement is false and/or misleading leads to a downward shift of the demand curve. CBC builds on the statistical methods of Hierarchical Bayesian Estimation ("HBE") and Mixed Logit Models ("MLM") to quantify consumer preferences and to calculate choice probabilities for the Product bundles included in the CBC study.

4.2.1 Overview of Conjoint Analysis

80. Similarly to the Hedonic Pricing Approach, Conjoint analysis assumes that consumers' preferences for a particular product are a function of the attributes, features or descriptions/advertisements of attributes/features embodied in that product.[43]

81. Conjoint analysis allow one to predict the share of respondents that would have chosen a specific product as described by the attribute levels.[44] Based on these estimations, it is possible to simulate ceteris paribus:

a. how a change in price changes the propensity to purchase, and

b. how demand changes if product attributes change.

82. Conjoint analysis thus can determine the difference in value (measured in dollars or as a percentage of the purchase price in the Actual-World) that customers place on Products without misrepresentations and without omissions compared to an otherwise identical product with misrepresentations and with omissions.

83. Conjoint analysis is widely used in market research and is discussed in depth in the market research literature.[45] Bryan Orme, the founder of Sawtooth software for conjoint analysis, estimates that over 18,000 commercial applications of conjoint analysis take place each year.[46] For example, Vithala Rao's book, *Applied conjoint analysis*, and Bryan Orme's book, *Getting Started with Conjoint Analysis: Strategies for Pricing Research*, provide numerous examples of the widespread use of conjoint analysis including, but not limited to, several high-profile applications by large corporations and large public agencies such as (i) Microsoft for pricing newly released hardware products, (ii) Proctor & Gamble for consumer-goods pricing and new product development, (iii) Marriott Corporation for the development of the Courtyard hotel brand, (iv) AT&T for developing optimal cellular plans and (v) the development of the EZ-Pass

---

43 Lancaster. (1966). A New Approach to Consumer Theory. *Journal of political Economy, 74*(2), 132-157.

44 Allenby and Rossi. (2006). *Hierarchical Bayes Models,‖ in the Handbook of Marketing Research: Uses, Misuses, and Future Advances, R. Grover, Ed., and M. Vriens, Ed*. Thousand Oaks: Sage Publications.

45 See, for example, Rao. (2014). *Applied Conjoint Analysis*: Springer.,Orme and Chrzan. (2017). *Becoming an Expert in Conjoint Analysis*: Sawtooth Software, Inc.

46 Orme. (2014a). *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research* (3rd ed.). Manhattan Beach, CA: Research Publishers LLC, p. 143.

electronic toll collection system by regional transit agencies in New York and New Jersey in the 1990s.[47]

84. Using survey data, conjoint analysis is a set of econometric and statistical techniques that have been developed to study consumers' decision-making processes, determining trade-offs between products, features, and price, as well as quantifying consumers' gains and/or losses of utility when choosing between different alternatives. By simulating real world and/or hypothetical choices between product features and prices under different levels of information, conjoint analysis is ideally suited to model the impact of different choice scenarios on a consumer's utility function. Conjoint analysis has been accepted as a methodology sufficient to measure class-wide damages in other deceptive advertising cases and in product defect cases across the country.[48]

85. The data required for a conjoint analysis is collected through a survey where study participants are shown several product profiles with different levels of each attribute. The survey participants are generally consumers who currently are, or recently have been, in the market for the product of interest. After reviewing a set of choice menus of product attributes and their levels, survey participants are then asked to indicate their preferences for those profiles. The product profiles include choice options for different price points for each set of features on the choice menu.

86. After the completion of the conjoint survey, conjoint analysis uses data from the survey on the attribute levels of the product profiles shown and the stated preferences for one choice set over another to decompose the respondents' preferences for the product into the partial contribution of these attribute levels or part-worths to the overall product utility using appropriate

---

47 Orme. (2014a). *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research* (3rd ed.). Manhattan Beach, CA: Research Publishers LLC, pp. Foreword, Chapters 4.2, 14.11, and 14.18.

48 See e.g., *In Re Arris Cable Modem Consumer Litigation*, No. 5:17-CV-01834-LHK, 2018 U.S. Dist. LEXIS 136617 (N.D. Cal. Aug. 10, 2018); *Khoday v. Symantec Corp*., 93 F. Supp. 3d 1067, 1082 (D. Minn. 2015). *See also TV Interactive Data Corp. v. Sony Corp*., 929 F. Supp. 2d 1006, 1026 (N.D. Cal. 2013); *Sanchez-Knutson v. Ford Motor Company*, 181 F. Supp. 3d 988, 995 (S.D. Fla. 2016); *Dzielak v. Whirlpool*, 2017 WL 6513347 (D.N.J. Dec. 20, 2017); *In re ConAgra Foods, Inc*., 90 F. Supp. 3d 919 (C.D. Cal. 2015); *In Re Dial Complete Marketing and Sales Practice Litig*., 320 F.R.D. 326 (D.N.H. 2017); *Fitzhenry-Russell v. Dr. Pepper Snapple Group, Inc.*, No. 5:17-cv-00564, (N.D. Cal., June 26, 2018); *Theodore Broomfield, et al. v. Craft Brew Alliance, Inc*., No. 5:17-cv-01027-BLF (N.D. Cal., Sept. 25, 2018); *Hasemann v. Gerber Products Co*., No. 15-cv-2995MKBRER (E.D.N.Y. Mar. 31, 2019). *Krommenhock v. Post* Foods, LLC, 16-cv-04958-WHO (N.D.CA. Mar,. 9, 2020). Lerman v. *Apple, Inc*., 15 CV 7381 (SJ) (LB) (E.D.N.Y. Oct. 6, 2020),

statistical methods, more specifically Hierarchical Bayesian Estimation and Mixed Logit models. These advanced statistical techniques will be discussed in more detail in Section 4.3 below. These statistical estimation techniques quantify the part-worths for attribute levels such that the resulting estimated part-worths best predict respondents' preferences or choices as a whole based on their CBC study responses. By summing the respondents' part-worths for different attribute levels, one can determine the share of respondents that would have purchased the product made up of the different levels of each attribute at a given price. By varying the price, we can estimate a demand curve for a specific product.

87. The price reduction needed to compensate for the loss of a feature (or the incremental price consumers would pay for the inclusion of a feature) can then be estimated, and a variety of choice situations and trade-offs between choices can be modeled, along with a precise quantification of their outcomes. The precision, and thus the reliability, of the resulting estimations depends on the number of survey participants. The more respondents that take part in the survey, the more precise the resulting predictions will be. However, adding more respondents to a survey is costly and the marginal benefit of adding respondents to a survey is declining. In Section 4.2.7, I describe a rule of thumb on how many respondents to include in a conjoint survey.

4.2.2 Statistical Estimation Techniques Utilized in Conjoint Studies

88. After the completion of the survey, the conjoint analysis uses data from the survey to decompose the respondents' preferences for a product into the part-worths of its attribute levels using appropriate statistical methods. The statistical models to be used in my analysis, Mixed Logit Models and Hierarchical Bayesian Estimation ("HBE"), are widely employed in economics and marketing research to analyze preferences over a discrete set of choices.[49] These statistical estimation techniques quantify the part-worths for feature levels such that the resulting estimated part-worths best predict respondents' preferences or choices from the survey. By adding up the part-worths by each respondent at the different attribute levels, one can determine the share of respondents that would have purchased the product made up of the different levels of each attribute and a given price.

[49] *See,* for a detailed discussion, Orme and Chrzan. (2017). *Becoming an Expert in Conjoint Analysis*: Sawtooth Software, Inc., Chapter 10.

89. Mixed Logit models are based on the idea that each consumer assigns a utility to each choice, and this utility measures the attractiveness of each choice. These utility values are correlated with the attributes of the actual choice (e.g., products with a misleading claim) and the price associated with that choice. The utilities can be correlated with observable characteristics of the consumers making the choice (such as their age or income).

90. The utility of each product consists of two components – a deterministic component and a random component. The deterministic component can be modeled by observable factors such as socio-economic and demographic characteristics of the consumers, product features, and market conditions. In general terms, the random component, by contrast, summarizes all the unobservable factors in the individual consumer's choice process. In Mixed Logit models, the random component is expressed through a logistic distribution function. Together with the observable factors, this distribution function is used to predict the probability that a particular consumer choice is made.[50]

91. Bayesian statistics is a field of statistics where the underlying model parameters are assumed to be random variables rather than fixed quantities. Bayesian modelling is based on assigning prior probability distributions to any unknown parameters. In this case, the unknown parameters to be estimated are the part-worths of the attributes of a composite product derived from the choice sets in the conjoint analysis. These parameters are estimated by a technique referred to in the literature as Hierarchical Bayesian Estimation ("HBE").[51]

92. In HBE, the parameter estimates are derived in a two-step hierarchical approach. At the higher level, the individual consumers' part-worths are assumed to follow a specified distribution (like multivariate normal distribution or log-normal distribution). At the lower level, it is assumed that the individual consumers' choice probabilities can be described by a model, such as a Mixed Logit model. Initial estimates of part-worths are estimated for each study respondent as a starting point. New estimates are updated using an iterative process called "Gibbs Sampling" and

[50] *See*, for example: Rao. (2014). *Applied Conjoint Analysis*: Springer., Chapter 4, for a detailed discussion of the use of mixed multinomial logit models in choice based conjoint studies.

[51] *See* Rao. (2014). *Applied Conjoint Analysis*: Springer. Chapter 4.11, for a detailed discussion of the use of Hierarchical Bayesian Estimation in choice based conjoint studies.

"Metropolis Hastings Algorithms."[52] This process is typically repeated thousands of times whereby at each iteration, an estimate is made for each parameter, conditional on current estimates of the others. After many iterations, this process converges to the correct estimate for each of the parameters.

93. The HBE method combines random effect specifications at the aggregate level to account for variation across individuals and specific modelling of choice probabilities at the individual level. With market simulations, the performance of competing alternatives can be evaluated.

94. The software program Sawtooth[53] is a commercially available and highly regarded software to compute part-worths for the attribute and its levels for each attribute in the study. The Sawtooth software applies the Hierarchical Bayesian Estimation technique explained above to compute individual part-worths for each respondent and aggregate part-worths for all levels and attributes in the study. The Sawtooth software allows the researcher to test different model specifications.

95. The Sawtooth software allows the researcher to "smooth" the part-worth estimates in a way that higher price levels for a specific attribute combination are always associated with a lower part-worth value. This feature ensures that, not only are aggregated consumer choices used, but that individual consumer choices are also always associated with decreasing utility values for increasing prices. When using a monotonicity constraint, the demand curves are smoother, and therefore, the resulting market simulations have fewer extreme data points which makes them more robust.

96. Furthermore, advanced statistical methods can be applied to compute model-based approximate confidence intervals. In 2016, the American Association of Public Opinion Research ("AAPOR") issued a guidance paper on "Reporting Precision for Nonprobability Samples"[54]

---

[52] Rao. (2014). *Applied Conjoint Analysis*: Springer, p. 168.

[53] Sawtooth software is a world leader in market research for conjoint analysis providing powerful tools for measuring how consumers value features of a product or service. For more information, see www.sawtoothsoftware.com/.

[54] AAPOR Guidance on Reporting Precision for Nonprobability Samples - https://www.aapor.org/getattachment/Education-Resources/For-Researchers/AAPOR_Guidance_Nonprob_Precision_042216.pdf.aspx

which details approaches and reporting guidelines for precision calculations performed for non-probability samples. For the statistical analysis of the data obtained through the CBC study, I will apply one of the recommended methods to obtain precision estimates and approximate confidence intervals at the customary 95% level for the results of the study. The bootstrapping methodology and the use of non-parametric percentile-based approaches have been endorsed as valid approaches by AAPOR.[55] Furthermore, the aforementioned Sawtooth Software also allows for a non-parametric approach in computing confidence intervals.

4.2.3 Measuring the Value of an Attribute Level Using CBC

97. The following steps explain the mechanics of how the results of a CBC study can be used to determine the value of an attribute.

98. Based on the part-worths derived from the CBC study, the percentage of study participants who would have purchased a certain product at a given price can be calculated. In the example presented in Figure 2 below, 45% of study participants would buy Product A without the desirable Attribute X for $30.00.

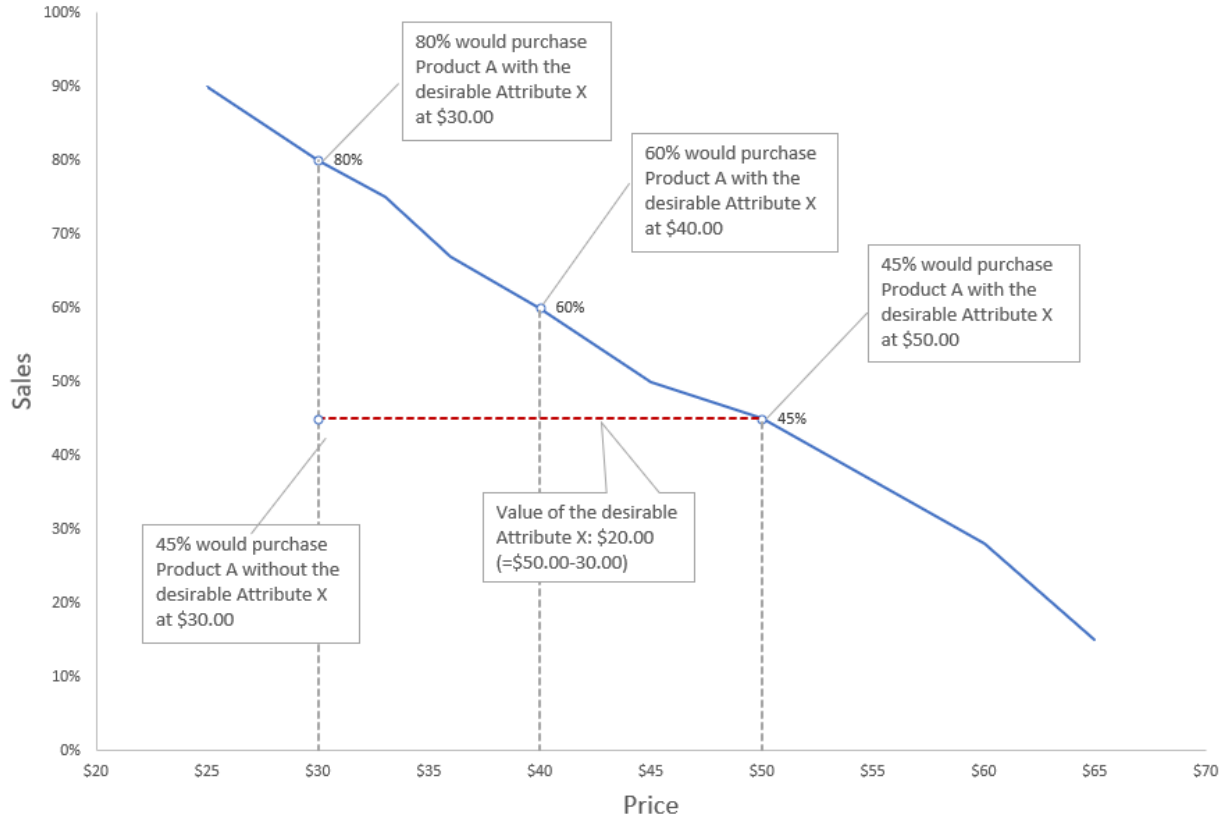
99. If I now add the desirable Attribute X to Product A, 80% of study participants would buy Product A when it has Attribute X for $30.00.

100. As the price for Product A with Attribute X is increased to $50, the percentage of study participants choosing Product A with the desirable Attribute X drops to 45%, which was the same percentage of study participants who bought the Product A without the desirable Attribute X for $30.00.

101. Any further increase in price would make fewer study participants choose Product A with the desirable Attribute X. In an economic sense, the CBC study has shown that consumers are indifferent between buying Product A without the desirable Attribute X at $30.00 and buying the otherwise identical product with the desirable Attribute X at $50.00. This implies that the value of the desirable Attribute X to the consumer is $20.00 ($50.00 minus $30.00).

[55] https://www.aapor.org/getattachment/Education-Resources/For-Researchers/AAPOR_Guidance_Nonprob_Precision_042216.pdf.aspx.

Figure 3: Measuring the Value of a Level of an Attribute Using CBC Analysis



Source: Illustrative Example

102. The calculation described above essentially finds the intersection between:

a. The curve representing the decreasing share of respondents who would have purchased Product A with the desirable Attribute X, and

b. The horizontal (dotted red) line representing the share of respondents who would have bought the otherwise identical Product A without the desirable Attribute X.

103. In more general terms, using the results from the CBC study, the value of each attribute can be determined as follows:

a. Find the share of study participants S_{wo} who would pay Price P_1 for a product without the attribute.

b. Add the attribute and calculate the share of study participants S_w who would buy the Product at price P_1.

c. Incrementally increase the price until you find the price P_2 for which the share of respondents buying the product with the attribute (S_w) equals the share of study participants buying the product without the attribute (S_{wo}).

d. The difference P_2 minus P_1 provides a reliable estimate of the value of the attribute.

4.2.4 Constructing Demand Curves

104. By using the individual part-worths, it is possible to estimate the share of respondents who would purchase a specific combination of attribute levels used in the conjoint survey. By varying the price levels while keeping all other attributes constant, we can determine the demand curve for any specific combination of product attributes and their levels as part of a market simulation.

105. By changing the level of one attribute, for example, for the attribute level "200 thread count" and "400 thread count", while keeping all other attributes constant, we can estimate two demand curves:

a. the Actual-World demand curve for a product without a label that says the product's thread count is 200, and

b. the But-For demand curve for the same product but with a label that says the product's thread count is 400.

106. If for a given volume the two demand curves result in different prices, one can then determine the compensation purchasers would require so that the number of products sold in the Actual World and the But-For-World remains unchanged.

107. To assess the robustness of the demand curve estimation under a variety of market conditions, I performed a comprehensive market simulation study. In my market simulations, I used all variations of the attributes and levels defined in the conjoint study to test if economic damages exist.

108. Market simulations[56] are necessary to convert the part-worths from the conjoint study into reliable monetary measures reflecting consumer preferences and choices. These monetary measures will ultimately be utilized to test and quantify how changes in an attribute will affect the value that consumers put on that attribute. In general, different permutations of product attributes and levels of those product attributes are applied in a market simulation to assess the respondents' choice probabilities for different combinations of product attributes and the resulting economic loss. This approach allows to estimate the value of each attribute individually and in combination with other attributes in the conjoint study.

4.2.5 Quantifying Changes in Demand

109. In the following I describe how I quantify the change in demand when an attribute changes. Note, that I do not assume a downward shift of the demand curve but rather test empirically whether the But-For demand shifts and in which direction.

110. Depending on the attributes tested in the CBC study and the degree of homogeneity of consumer preferences towards the statement, the change in demand may be measured in several different ways, including:

a. As a specific dollar amount that is fixed across all price points at which the product was sold in the Actual-World;

b. As a percentage of the purchase price when the drop in demand results in a new demand curve that is proportional to the demand curve in the Actual-World; or

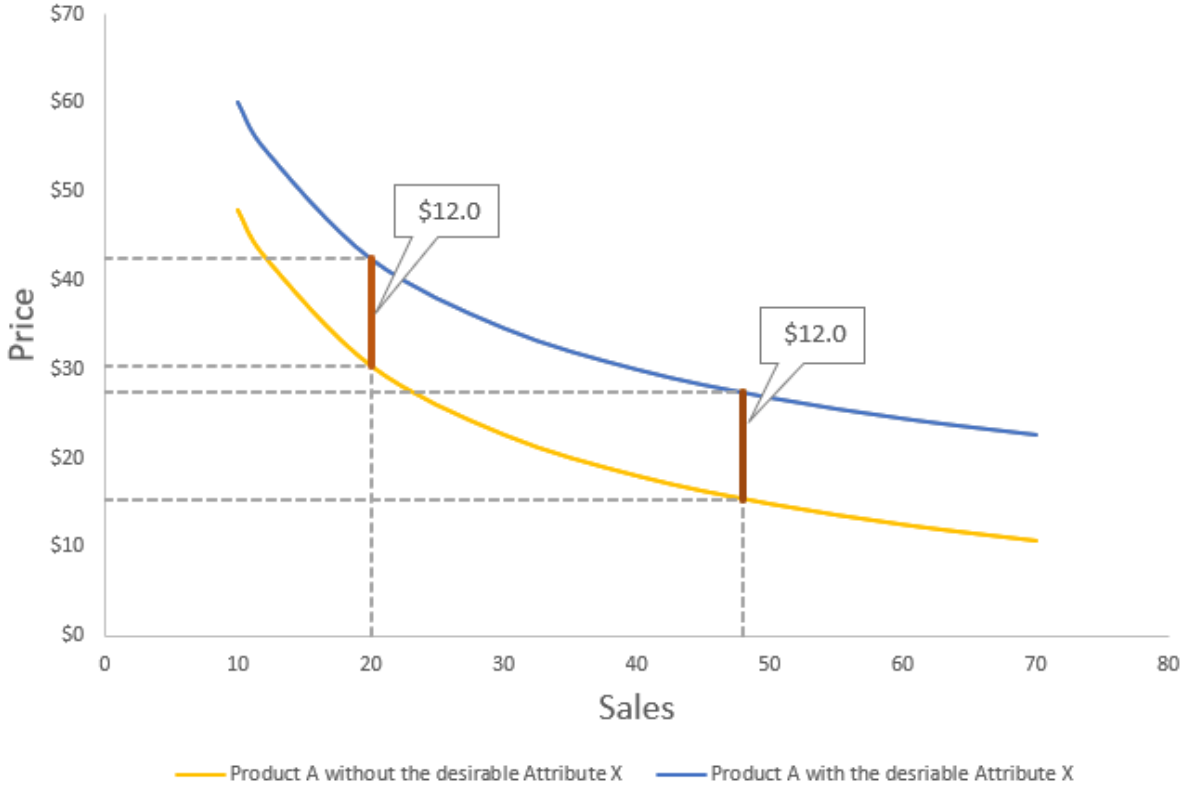
c. As specific dollar amounts when the drop in demand results in a new demand curve that varies in the degree of the economic loss for different price points observed in the Actual-World.

111. It should be emphasized that, while the change in consumer demand at different price points cannot be known at the outset of the study, the conjoint study provides information to estimate the change in consumer demand at a range of different price points. The figures below illustrate how three possible outcomes of the study and the implications for damage calculations.

[56] Orme and Chrzan. (2017). *Becoming an Expert in Conjoint Analysis*: Sawtooth Software, Inc., Chapter 10.

112. Figure 4 an illustration of a study outcome that finds homogeneity in the way that consumers value a false statement or an omitted fact evenly by a fixed amount at different price points. It should be noted that the study will provide sufficient information in order to statistically test whether variations in estimates of different price points are statistically significant or not (i.e., whether small variation in estimates at different price points is the result of chance). In the case where the study finds that consumers value correct statements and not omitting pertinent facts by a fixed dollar amount, class-wide damages could be calculated by multiplying the fixed amount by the number of units of the product purchased in the Actual-World.

Figure 4: Demand Curve Shift by Constant Dollar Amount

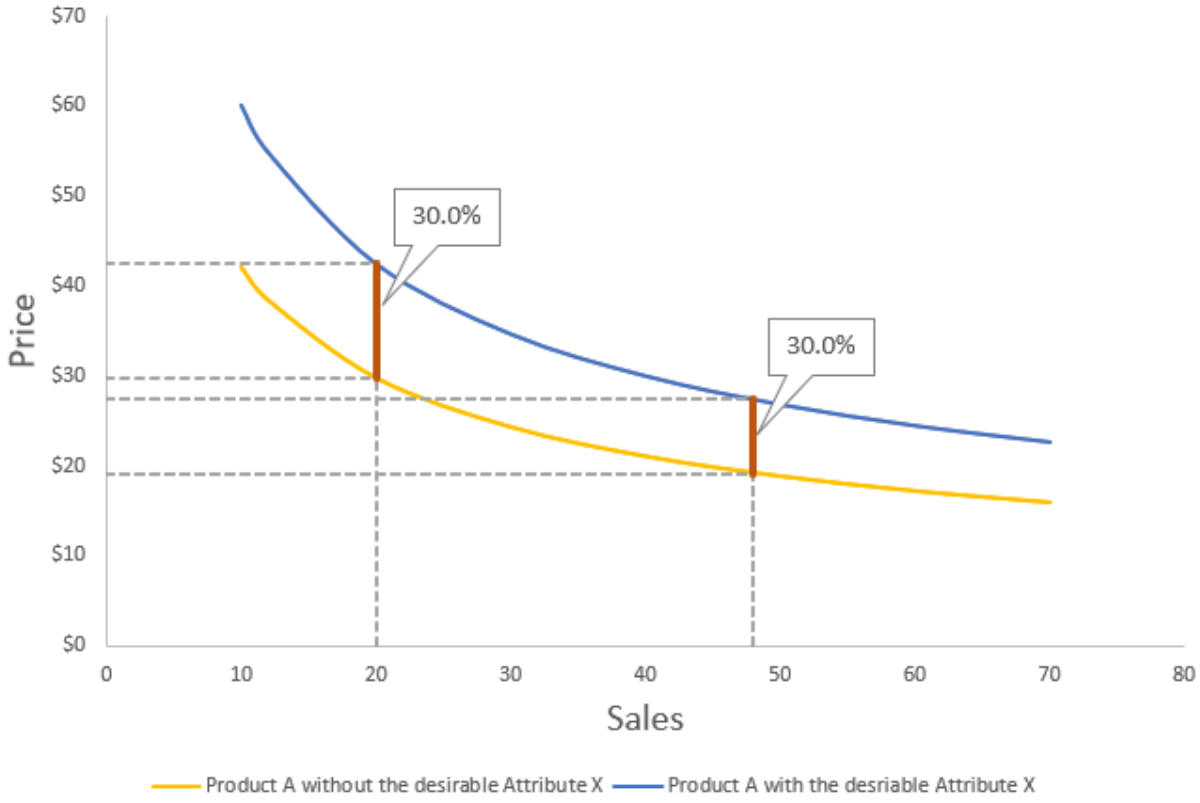


Source: Illustrative Examples

113. Similar to the illustration in Figure 4, Figure 5 provides an illustration of another possible study outcome that finds homogeneity in the way that consumers value correct statements and not omitting pertinent facts evenly at different price points, but in this case consumers do not value correct statements and not omitting pertinent facts by a fixed dollar amount at each price point,

but instead by a fixed percentage of the purchase price they are offered. It should again be noted that the study will provide sufficient information in order to statistically test whether small variations in estimates at different price points are statistically significant or not (i.e., whether small variation in estimates at different price points is the result of chance). In the case where the study finds that consumers value correct statements and not omitting pertinent facts by a fixed percentage of the price offered, class-wide damages could be calculated by multiplying the percentage by the revenue generated by the products purchased in the Actual World.

Figure 5: Demand Curve Shift by Constant Percentage

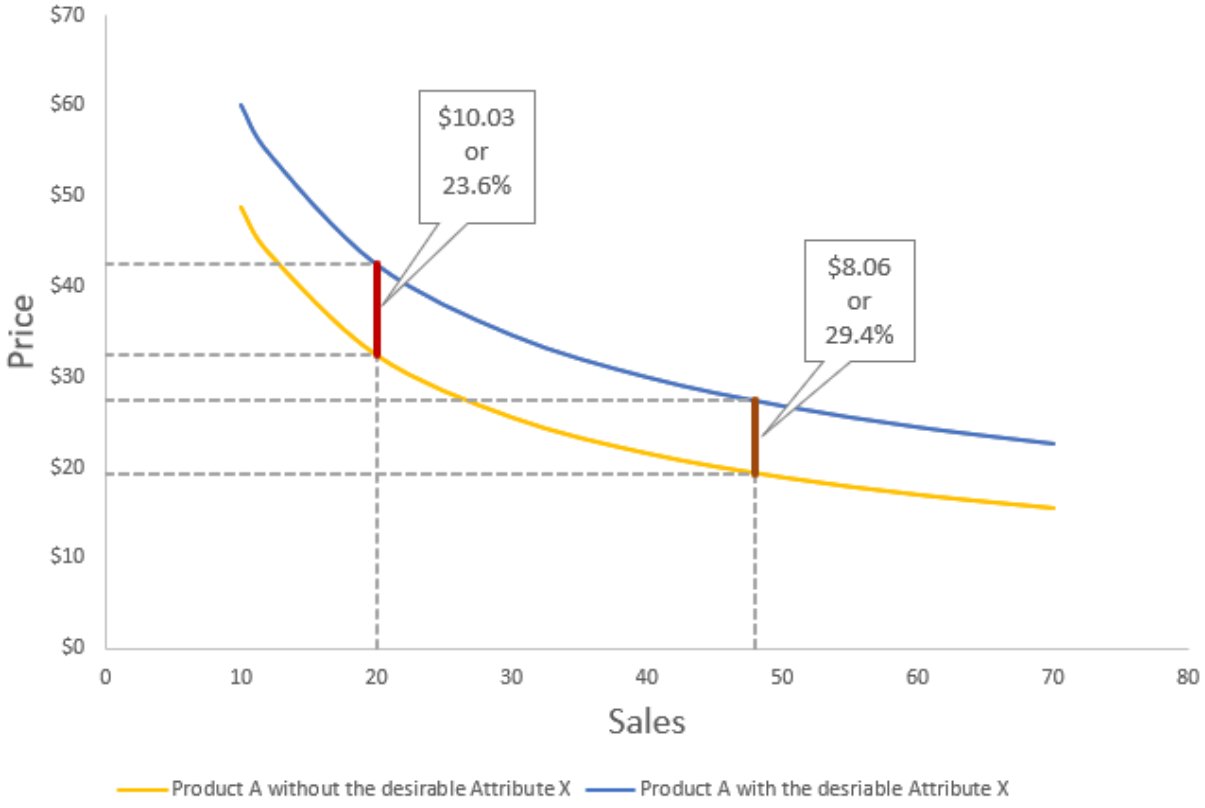


Source: Illustrative Example

114. Figure 6 provides an illustration of yet another study outcome that does not find homogeneity in the way that consumers value an attribute at different price points. In this example, the empirical study may determine that a consumer who would buy the product at $42.43 with the claim, but would purchase product without the claim for $32.40 - a $10.03 or 23.6% discount to the $42.43 price. Another consumer who would buy a Product at $27.39 with

the claim would only purchase that same product without the claim for $19.33 at a $8.06 or 29.4% discount. In this case, Class-wide damages would need to be calculated by applying the discount to Product at the price points actually experienced by the consumers using the best available information.

Figure 6: Demand Curve Shift When Percentage and Price Vary



Source: Illustrative Example

4.2.6 Market Estimates vs. Individual Economic Loss

115. My model is designed to provide market estimates of economic loss. Sawtooth estimates part-worths for each participant in the study. Therefore, it could be tempting to estimate economic loss at the individual level. As I discuss in the following, such analysis will provide unreasonable results and would not be reliable.

116. It is well-established that individual level part-worth estimates of conjoint models are not reliable at the individual level and that results should only be considered at the aggregate level,

as summarized by Brian Orme, one of the authors of the Sawtooth conjoint software which I rely on in my analysis:

> *Since the late 1990s, hierarchical Bayes has permitted individual-level estimation of part-worth utilities from CBC data. But to compute individual-level models, HB uses information from many respondents to refine the utility estimates for each individual. Therefore, one usually does not calculate utilities [part-worths] using a sample size of one.*[57] *B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40) B. K. Orme (2014b, p. 40)*

117. Or as Hauser & Rao (2004) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) John R. Hauser and Vithala R. Rao (2004, p. 18) explain[58]:

> *[…] while consumers are heterogeneous, there is information in the population distribution that can be used to constrain the estimates of the partworths for each respondent. […] The researcher does not attempt to estimate point-values of the partworths, but endeavors to fully characterize the uncertainty about those estimates (mean and posterior distribution).*

118. While these quotes make a strong argument not to rely on individual estimates, in the following, I illustrate further why individual estimates are not reliable.

119. For example, suppose that a CBC study contains six attributes. Also suppose that five attributes are binary and the sixth attribute, price, has five levels. Therefore, the survey includes

---

[57] Orme. (2014a). *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research* (3rd ed.). Manhattan Beach, CA: Research Publishers LLC, p. 68.

[58] Hauser and Rao. (2004). *Conjoint Analysis, Related Modeling, and Applications*. Springer, p. 14.

160 permutations[59] of the attributes. Suppose that each respondent sees 15 screens with two choices on each. Hence, each respondent sees a total of 30 combinations of the six attributes in the conjoint survey. That means that each respondent sees only 18.8%[60] of all possible permutations. It would therefore be very difficult to predict whether a specific respondent would choose a particular attribute combination over another attribute combination that this respondent has not actually seen in her survey and for which we have not collected any data. In order to properly predict how a specific respondent would choose between two choice sets, we would need to have each respondent go through many more choice sets – a tiring exercise for each respondent and not necessary for the purpose of my research. We are interested in how the market overall would react to a change in the attributes of a product. We are not interested in the probability of each individual survey participant purchasing a particular attribute combination.

120. Estimating the share of respondents who would purchase a particular attribute combination does not require precise predictions for each individual respondent. By estimating a share at the aggregate level, we are able to provide an estimation that – in aggregate – is reliable.

121. This approach is analogous to the use of statistical sampling to predict consumer behavior in general. No sampling-based model designed to predict consumer behavior would make predictions based on a sample size of one consumer because such a model would fail to predict market-wide consumer behavior and preferences.

4.2.7 Design and Implementation of CBC Study for Economic Loss Calculations

122. In this chapter, I discuss the design and implementation of the proposed CBC study. I describe technical design details, criteria for choosing attributes, the implementation of the CBC study and the pre-test I propose to conduct to ensure the CBC study will yield reliable results.

4.2.7.1 Internet Based Panel Surveys

123. I propose to conduct the conjoint survey in the form of an internet survey. Current research suggests that internet surveys have great advantages over other traditional survey methods. For

[59] 160=2x2x2x2x2x5.

[60] 18.8%=30/160.

instance, studies have found that computer data collection yields higher concurrent validity, with less chance of participants framing answers to attempt to please the questioner, and less random measurement error when compared to mall intercept and telephone surveys.[61]

124. Internet surveys have become a standard tool in the corporate world. According to the Global Research Business Network, internet surveys now account for more than a quarter of global market and social research revenues. In many of the world's top research markets, internet surveys are now the primary means of research.[62] Well-executed internet survey research is regularly accepted by courts.[63]

125. The efficacy of internet-based surveys is also due to large internet panels retained by specialized market research firms. These firms employ trained professionals who program, administer, and quality control the surveys to increase the quality of the results.

126. In my prior conjoint analyses, I have commissioned survey vendors to program and host surveys and conjoint studies of my design. I will retain a reputable survey vendor specializing in online conjoint surveys and has access to large online consumer panels for this survey. The survey will be designed and conducted in such a way that neither the vendor nor any of the respondents know the purpose of the survey or that the survey is in any way connected to this litigation.

4.2.7.2 Definition of Target Population

127. Survey participants from the consumer panel, who receive an invitation to participate from the survey vendor and accept the invitation to participate in the survey, will be selected using population benchmarks for selected demographic and socio-economic variables from the U.S. Census Bureau, ensuring that the respondents starting the survey matched the population of the states of California, by age (18 years or older) and gender. This representative sample of

---

61 Yeager, Krosnick, Chang, Javitz, Levendusky, Simpser and Wang. (2011). Comparing the Accuracy of Rdd Telephone Surveys and Internet Surveys Conducted with Probability and Non-Probability Samples. *Public Opinion Quarterly, 4*(1).

62 Rao. (2015). *The Next Frontier for Online Survey Companies: Law Firms*. Fortune. Retrieved from http://fortune.com/2015/09/16/online-survey-companies-law-firms/.

63 Isaacson, Hibbard and Swain. (2008). Why Online Consumer Surveys Can Be a Smart Choice in Intellectual Property Cases. *IPL Newsl., 26*(3).

participants will be asked filter/screening questions in order to identify those consumers who purchased bedding or linen products during the relevant period.

128. I understand that the Class in this case will be defined as all persons in California who purchased Macy's CVC sheets supplied by AQ Textiles. To select a sample that adequately represents the class members, I will target a survey population of purchasers of bedding or linen products during the relevant period in the state of California.

129. I plan to only include survey respondents that meet the following criteria:

a. Respondents are 18 years or older;

b. Respondents live in California;

c. Respondents have purchased, or were involved in the purchasing decision, of bed sheets products during the relevant period;

d. Respondents or a close family member are not working in advertising agency or market research;

e. Respondents have not taken a survey related to bedding or linen products in the past 30 days.

130. Orme (2017)[64] describes a rule of thumb on how many respondents to include in a conjoint survey. It is recommended that the survey sample size should be computed according to the following formula:

$$\frac{nta}{c} \geq 1{,}000$$

131. Where n is the number of respondents, t is the number of choice sets, a is the number of alternatives per set and c is the maximum number of levels in any attribute.

[64] Orme and Chrzan. (2017). *Becoming an Expert in Conjoint Analysis*: Sawtooth Software, Inc, p. 96.

132. For example, if the number of choice sets is 15, the number of alternatives per set is 2 and the maximum number of levels in any attribute is 5, the sample size n should be greater than 167:

$$\frac{n*15*2}{5} \geq 1{,}000 \text{ or } n \geq \frac{1{,}000*5}{15*2} = 166.67$$

133. In the later chapters of this report, I propose an example survey for this study. The minimum sample size calculated based on the number of choice set, the number of alternatives per set, and the maximum number of levels in any attribute suggested in the example is [[xxx]]. Therefore, for this example survey, I plan to include approximately [[500]] participants. The final sample size will be determined to well exceed the minimum number of respondents calculated using the above formula.

4.2.7.3 Choosing Attributes

134. Choosing attributes and their respective levels is an important aspect of proper conjoint study design. In the following I describe the general consideration for attributes, the process of selecting attributes and the design of the choice menus that present the attributes.

4.2.7.3.1 General Considerations

135. In conjoint analysis, an attribute is described as a characteristic or feature of a product, which is comprised of different levels. Each attribute must have at least two levels. An attribute with two levels is binary and may indicate whether a product has a certain characteristic or not. For example, in this case the product is labeled as having a certain thread count such 800.

136. A conjoint analysis does not need to vary all attributes that define the product, but it should include relevant attributes. Researchers often instruct survey respondents to assume that they are purchasing a specific product and then vary only a few of the many attributes that define a product. For example, even though having wheels is utterly important for driving a vehicle safely, researchers would typically not include the number of wheels in the conjoint analysis as all modern cars have four wheels, an attribute that does not vary between different makes or models.

137. The academic literature recommends that CBC studies involve eight or fewer attributes, each comprised of two to five levels, in order to avoid fatigue and in order to consider the general ability of participants to process information.[65]

138. Rao (2014) suggests two sources available for determining relevant attributes:[66]

a. Previous consumer surveys or market surveys;

b. A pilot survey in which respondents are asked to rank a large selection of attributes.

139. In cases where discovery reveals that Defendants have conducted their own market research, or where reliable industry research is readily available, I will select the attributes of my conjoint survey based on key attributes identified in such research and use them in my conjoint study.

140. Orme recommends not showing more than six attributes in a conjoint study.[67] Hence, besides the origin and price, which is required to determine the monetary value, I added four other attributes as decoys to distract respondents from the real focus of the study. I selected the decoy attributes based on documents received from Defendants through discovery. These attributes are deemed to be relevant to consumers. That does not mean that these attributes need to be the most important attributes to consumers. Nor does it mean that the attributes currently need to be part of currently available products. Researchers regularly conduct conjoint surveys to assess how consumers value attributes manufacturers might consider adding to their products in the future.

4.2.7.3.2 Choice of Attributes for the Specific Study

141. The goal of this survey is to assess the value that customers who purchase bedding or linen products would place on thread counts.

---

65 Orme. (2014a). *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research* (3rd ed.). Manhattan Beach, CA: Research Publishers LLC, p. 53.

66 Rao. (2014). *Applied Conjoint Analysis*: Springer, p. 43.

67 Orme. (2002). Formulating Attributes and Levels in Conjoint Analysis. *Sawtooth Software research paper*, p. 1.

142. In the following, I list potential attributes and their respective levels for this CBC study. The attributes are similar to the attributes in the Hedonic Pricing Approach:

a. Thread count – levels for this attribute will be selected to meaningfully correspondent with the thread count of the Products, likely to range from 150 to 1800.

b. Weaving type

   i. Percale

   ii. Sateen

   iii. Flannel

c. Origin of the cotton

   i. Egypt,

   ii. Turkey,

   iii. United States

d. Style

   i. Fitted,

   ii. Flat

e. Type of cotton

   i. extra-long staple (ELS),

   ii. long-staple pima (Supima),

   iii. long-staple Egyptian

143. In addition, price is a required attribute of conjoint surveys to estimate the demand curves for my study. Conjoint analysis imitates the real-world purchase situation and the price levels presented to the respondents in the survey should cover an appropriate range of actual retail market prices. These prices reflect a market equilibrium of supply and demand in the Actual World. Three considerations determined the price range included in the study:

a. First, and foremost, the price range should cover realistic prices for the product. For example, a price of $0.25 would not be realistic as the typical retail price for bedding or linen product is far higher. Similarly, a price of $200 would also not be realistic. As part of the conjoint analysis, the price range will be validated: Were prices too low, all respondents would purchase, were prices too high, no respondents would purchase. In both cases, we would be unable to construct meaningful demand curves. This validation will be part of my proposed pre-test analysis.

b. Second, prices can and need to be higher or lower than the prices of currently offered products as we test product attribute combinations that might not yet be available in the market.

c. Third, in the case where the impact of misrepresentation has to be assessed, the price for a product where it is known that the information is false and/or misleading has to be determined. However, such product is currently not available in the market. Hence, in order to estimate a demand curve for the product where it is known that the advertised claim is false and/or misleading, prices both below and above the price points common in the market have to be included.

4.2.7.4 Design of Choice Menus

144. Study participants will be given 10-15 CBC exercises. Each choice exercise will consist of two choices with various combinations of attribute levels and prices. As part of the introduction to the conjoint module, participants were introduced to each attribute. In addition, they could also recall the information provided on each attribute in each conjoint exercise by hovering their mouse over a help icon.

145. In each of the 15 exercises, respondents will be presented with two choices out of several dozen possible permutations. Hence, each respondent will see a total of 30 permutations. After respondents choose their preferred option, they answer the question "would you purchase the option you selected above?" This design is called the "dual-response none method"[68] and

[68] Orme and Chrzan. (2017). *Becoming an Expert in Conjoint Analysis*: Sawtooth Software, Inc, pp. 123-124.

provides additional information because it is possible that the respondent would not want to buy any of the two options but prefers Option 1 over Option 2.

146. In his seminal publication on conjoint analysis, Rao discusses the number of choices represented on one choice menu.[69] Recent eye-tracking studies have shown how respondents react to conjoint screens. The authors realized the value of limiting the number of options shown on each screen to two rather than three or five as had been often done in the past.[70] Following the academic research, I designed the study with two choice options per screen to enable respondents to process the complete information provided and to avoid issues of fatigue.

147. It is a known phenomenon that choices presented earlier in a list of choices in a questionnaire are disproportionately likely to be selected.[71] This phenomenon is known as order bias. To avoid order bias in my study, each respondent will see the attributes in a randomly assigned order, except for price, which is always shown last. Per standard practice, price is shown last because the respondents must see the attributes of the product first to be able to decide for or against the purchase of an option. Also, per standard practice, while the order of attributes varies between respondents, the order of attributes a specific respondent would see throughout his exercises will not vary.

4.2.7.5 Pre-Test

148. The *Reference Guide on Survey Research*[72] recommends administering a "pre-test" survey, which is defined as administering the proposed survey to a small sample of the same target population before conducting the full-scale study. Properly conducted pre-tests can inform the researcher of potential flaws in the survey design or sources of potential misunderstanding of

---

69 Rao. (2014). *Applied Conjoint Analysis*: Springer, pp. 132-133.

70 Meyerding. (2018). Combining Eye-Tracking and Choice-Based Conjoint Analysis in a Bottom-up Experiment. *Journal of Neuroscience, Psychology, and Economics, 11*(1), 28., Bansak, Hainmueller, Hopkins and Yamamoto. (2019). Beyond the Breaking Point? Survey Satisficing in Conjoint Experiments. *Political Science Research and Methods*, 1-19.

71 Krosnick and Alwin. (1987). An Evaluation of a Cognitive Theory of Response-Order Effects in Survey Measurement. *Public Opinion Quarterly, 51*(2), 201-219.

72 Diamond. (2011). *Reference Guide on Survey Research*. Washington D.C.: National Academies Press.

the meaning of questions, giving the researcher a chance to rephrase and change wording of the questionnaire to be clear and unambiguous.[73]

149. I expect to conduct a pre-test and observe if the survey respondents understand the survey questions and their choices clearly. If any confusion or other difficulties with the questions arise, I will probe for the source of any such difficulties and revise the survey design, accordingly, ensuring the clarity and quality of my survey design.

150. If the survey questionnaire needs to be changed after the pre-test, the pre-test results will be discarded. If the survey questionnaire can be fielded without modification the pre-test results will be incorporated into the overall survey results.

5 Summary and Conclusion

151. In this report, I introduced a theoretical economic model that shows how the demand for a product changes when attributes and levels of attributes for that product change. The change in demand when the attributes of the product change (e.g., when claims about the product are revealed to be false and misleading) can be established through empirical analyses.

152. In essence, the theoretical model proposed in this report measures the difference between the price paid and the value received by customers who purchased the Product where they never viewed the Product's false and misleading label.

153. I introduced two empirical approaches to estimate economic loss:

a. The Hedonic Pricing Approach is long established and has been applied successfully in other false advertising cases. The data required for this approach could either be compiled by Defendant or could be compiled from data obtained during discovery and other sources.

b. Survey-based conjoint analysis is a reliable way to quantify the change in demand when the attributes of the product change (e.g., when claims about the product are

[73] Diamond. (2011). *Reference Guide on Survey Research*. Washington D.C.: National Academies Press., pp. 388-389.

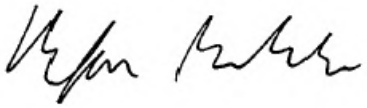
false and misleading or when important information is omitted). The researcher can apply the well-established scientific methodology of Mixed Logit modeling and Hierarchical Bayesian Estimation to analyze the data from the efficiently designed CBC analysis and draw inferences about the value of an attribute to customers at the point of purchase. The conjoint analysis can empirically measure what respondents would have paid for a product with and without the alleged attribute. This value can be used to determine if consumers suffered an economic loss and, if so, to calculate that loss.

154. Lastly, I conclude that the theoretical and empirical methods proposed and described in this report can be used to calculate class-wide damages in the merits phase of this case by multiplying the percentage of economic loss per unit as established above with the sales of the product during the class period. The empirical analysis enables the computation of economic losses either as a specific, fixed dollar amount, or as a percentage of the purchase price. Hence, variations in the purchase price will not prevent the calculation of class-wide damages.

155. In addition, the model proposed in this report to compute class-wide economic losses can also be expanded in the merits phase of this case to incorporate additional aspects should the Court deem it necessary. For example, economic loss calculations can be performed on a class-wide basis across different price points for which the products were sold. The methodology that I have proposed in this report has been approved by courts as a measure that can quantify economic losses to consumers to a reasonable degree of economic certainty.

156. The analysis and opinions contained in this report are based on information available as of the date of this report. I reserve the right to supplement or amend this report in the event additional information becomes available.

Respectfully submitted on February 1, 2021



Stefan Boedeker

Exhibit A

STEFAN BOEDEKER

Managing Director
Berkeley Research Group

Century City, Las Vegas,
Los Angeles, Washington DC
Tel: (310) 499-4924
Cell: (213) 705-1324
Email: sboedeker@thinkbrg.com

Education

- BS in Statistics,
  University of Dortmund, Germany
- BA in Business Administration
  University of Dortmund, Germany
- MS in Statistics
  University of Dortmund, Germany
- MA in Economics
  University of California, San Diego
- Met Ph.D. requirements except dissertation in Economics,
  University of California, San Diego

Professional Associations

- Member of the American Economic Association (AEA)
- Member of the American Statistical Association (ASA)
- Member of the Econometric Society
- Member of the Mathematical Association of America (MAA)
- Member of the American Association for Public Opinion Research (AAPOR)
- Member of the Insights Association (FKA MRA)
- In 2001 Stefan was a member of an AICPA task force dealing with Corporate Integrity Agreements (CIA). Stefan was responsible for issues related to statistical methodology utilized in CIA's.

Background

Stefan is a Managing Director at Berkeley Research Group where he focuses on the application of economic, statistical, and financial models to a variety of areas such as solutions to business issues, complex litigation cases, and economic impact studies. He has extensive experience applying economic and statistical theories and methodologies to a wide variety of cases where But-for-scenarios have to be developed based on probabilistic methods and where statistical predictive modeling has to be applied to assess liability and damages.

Stefan has applied these techniques in business disputes, single-plaintiff cases, multi-plaintiff cases, and class action proceedings in the areas of class certification, liability assessment, developing damages scenarios, and post settlement or judgment distributions.

Professional and Business Experience

Representative Engagements

Litigation

» In a class action alleging misleading advertising practices, Stefan performed statistical analyses in the class certification stage.

» For a major healthcare provider involved in a dispute with a potential class of more than 3,000 other providers over allegedly excessive outlier payments Stefan performed economic and statistical analyses. Ultimately, class certification was denied in that case.

» In a class action alleging discriminatory allocation of public funds by a large metropolitan transportation authority, Stefan performed statistical analyses of transportation data.

» In a multi-plaintiff case against a state authority on improper funding of special education programs, Stefan performed statistical analyses of funding related ledger data.

» In a class action alleging improper practices of charges for gym memberships, Stefan performed statistical analyses in the class certification analysis. Based on the analysis, the ultimately certified class was significant smaller than initially defined. In this case, Stefan also developed statistical models to assess damages.

Exhibit A

- In a class action alleging losses to consumers due to faulty window regulators in automobiles, Stefan utilized statistical models to assess economic damages.

- In a class action against a large financial institution alleging fee overcharges for personal trust accounts, Stefan utilized statistical analyses to segment the account holders and ultimately reduce the size of the class.

- In a class action case where a provider of a used car evaluation model was ordered by the court to test if their model did not significantly undervalued cars, Stefan performed statistical analyses.

- In a class action case over fee overcharges in the payment process of car insurance, Stefan developed a distribution model of repayments to class members after a settlement had been reached.

- In a class action of home owners over alleged diminution of property values due to proximity to a plume of contaminated soil, Stefan performed statistical analysis to assist counsel in a motion against class certification.

- In a natural resource damage class action case, Stefan provided econometric analysis of property value loss due to proximity to a solid waste site utilizing hedonic regression models.

- For a class action case involving potential damage from a landfill in a state park, Stefan analyzed data about travel, tourism and park attendance. Stefan specified and estimated linear regression models and time series models to predict park attendance.

- In a class action case involving alleged diminution of property values due to ground-water contamination, Stefan specified and estimated hedonic regression models to show that other factors than the contamination contributed significantly to the loss in property value.

- In a class action against a large financial institution alleging non-payment of coupon payments for bearer bonds Stefan designed and administered large-scale databases to reconstruct accounting records of a large financial institution's Corporate Trust Department. He developed statistical models to analyze bondholders' presentment behavior of Bearer bonds.

- In a class action dispute between the Department of Interior and individual Native Americans over mismanagement of individual trust accounts, Stefan performed a statistical analysis of an electronic database with approximately 60 million records in order to draw a statistically valid sample of accounts for further analysis.

- In a trademark infringement case of video equipment, Stefan calculated damages based on the defendant's unjust enrichment utilizing statistical time trend models.

- For a shareholder derivative action against a leading publicly-traded health care provider, employed an econometric approach to quantify potential damages per share due to alleged section 10b-5 violations and other claims. For the same matter, developed a multi-trader model to estimate the number of shares potentially damaged.

- In a dispute between a major health care provider and private payor groups, Stefan developed statistical stratified sampling models to assess exposure across different contract types.

Exhibit A

- For a large financial institution's personal trust department involved in a consumer class action, Stefan designed a random sample to estimate the potential exposure due to fee overcharges.

- For a computer equipment leasing company involved in an employee class action, Stefan utilized statistical models to estimate exposure due to alleged forfeiture of unpaid vacation time in a class action of former and current employees.

- For a limousine company involved in a wage and hour class action, Stefan developed a statistical sampling based exposure model to quantify the impact of alleged unpaid overtime and missed meal breaks.

- In several cases involving 12-hour shift workers at hospitals Stefan performed rebuttal analyses of plaintiff's damages computations.

- For a large electronic retail chain Stefan calculated exposure based on the failure of paying overtime for store managers.

- For a major department store Stefan performed a statistical analysis of manager surveys where he found significant differences in the managers' allocation of time across department and stores. Ultimately, due to these differences a class was not certified.

- For a large sporting goods retail chain Stefan assisted in defining the size of the potential class and in estimating the potential exposure which led to a favorable, early settlement of the case.

- For a women's shoes retail chain Stefan designed and statistically analyzed an observational study to quantify the amount of time spent on exempt versus non-exempt tasks.

- For a video rental store chain Stefan developed sampling algorithms based on in-store security cameras to analyze time spent by assistant managers on exempt versus non-exempt activities.

- For a large fast food chain Stefan directed a team collecting employee work information from restaurant locations in order to monitor and gain compliance in response to litigation

- For a large mass merchandiser Stefan developed a document and data reconciliation tool and he developed a statistical sampling mechanism to proof compliance with a court ordered document retention procedures in the course of a wage and hour litigation.

- Stefan worked with a Fortune 500 bank in a class action suit to review the claims of managers that were misclassified and should have been paid overtime. To compute damages, Stefan reviewed the overtime records of employees in this position prior to a job classification change and, in the absence of overtime data after the job classification change, Stefan reviewed sign in and sign out times of the office building.

- For a long-term care provider Stefan used data from timesheets, payroll, and other scheduling records to create comprehensive reports showing potential exposure for each of the claimed areas: timely wage payment, overtime wage payment, adequate daily meal and rest break periods, and travel time compensation.

Exhibit A

- For a maternity clothing store chain Stefan performed analyses related to exempt/non-exempt status issues for managers and assistant managers. Stefan also conducted a break time analysis for all employees.

- For a commercial flooring contractor Stefan assessed the job duties and responsibilities of a group of supervisors. During the engagement, the scope of work expanded to include an analysis of misclassification and back-pay exposure for additional groups of employees.

- For a software developer Stefan analyzed how department and project specific characteristics impacted the work flow and the correlation of that impact to certain exemptions.

- For a large meatpacker Stefan conducted a time and motion study to properly assess the duration of certain separately compensated activities to rebut allegations of violation of minimum wage laws.

- For a public university housing department Stefan conducted an extensive time and motion study to identify the tasks (and associated time range to perform each task) related to processing a contract cancellation.

- For a large drugstore chain Stefan used in-store cameras for the smaller stores and actual in-store observations for the larger stores to conduct a time motion study and quantify the time spent by assistant managers on certain pre-defined tasks.

- For a large public storage company Stefan conducted a detailed time and motion study to determine the cost of collection and administration of late payments. Using both self-logging and independent review techniques, Stefan defined each step in the late payment process, calculated the cost to the company for such activities, and compared this cost to the late fees under dispute.

- For a large retail store chain Stefan performed statistical analyses of regularly conducted employee activity surveys.

- For a mass merchandiser, Stefan conducted an observational study of activities of all individuals classified as managers to show significant differences in daily activities.

- For a department store, Stefan conducted an in-store observational study of managers and assistance managers to assess the percentage of time spent on managerial tasks.

- For a state ferry system in the Pacific Northwest, Stefan conducted an observational study of engine room personnel during shift changes to quantify potentially unpaid time worked.

- For a large retail chain Stefan conducted an extensive analysis of the company's compliance with break time rules and regulations and also the employees' usage and potential abuse of break time.

- For a large mass merchandise retailer Stefan compiled a comprehensive database of punch clock data, payroll data, point of sales data, hardcopy information about manual edits of time entries, store security system data, etc. to analyze allegations of inserting breaks, deleting time and forcing employees to work after they clocked out.

Exhibit A

- For a large electronic retail chain Stefan analyzed time card data, point of sales data and other store specific attributes to quantify potentially missed meal and rest breaks.

- In a gender discrimination case involving a client in the food processing industry, Stefan analyzed the impact of the implementation of an Affirmative Action Plan on the allegedly discriminatory employment practices.

- In a class action case alleging age discrimination for a vegetable seed company, Stefan performed rebuttal work of the plaintiff's expert's liability and damages analysis.

- In a class action case alleging age discrimination for a major aerospace company, Stefan performed statistical analyses to rebut allegations of age discrimination.

- In a class action race discrimination suit against the Alabama Department of Transportation, Stefan developed statistical regression models and tests to analyze the alleged discrimination.

- In a class action gender discrimination case against a large real estate brokerage firm, Stefan provided deposition testimony to class certification issues.

- In a gender discrimination case against a temporary employment agency, Stefan performed econometric analyses to disprove salary discrimination against two former female employees. Stefan addressed plaintiffs' expert's damages calculations and developed alternative scenarios.

- For a large meat processing plant, Stefan performed statistical analyses of employment data to address allegations of discriminatory hiring practices.

- For a leading publicly-traded developer of enterprise management software, Stefan employed a statistical approach to demonstrate the diversity of investment styles among proposed lead plaintiffs for a securities class action lawsuit alleging section 10b-5 violations and other claims. For the same matter, Stefan employed an econometric approach to estimate potential damages for each lead plaintiff.

- For a leading publicly-traded developer of enterprise management software, Stefan employed an econometric time-series model to analyze allegations of insider trading and the timing of certain stock transactions relative to information available to officers in the company.

- For a shareholder derivative action against a leading publicly-traded health care provider, employed an econometric approach to quantify potential damages per share due to alleged section 10b-5 violations and other claims. For the same matter, developed a multi-trader model to estimate the number of shares potentially damaged.

- For a publicly-traded manufacturer of office supplies, developed a Black-Scholes application and utilized a binomial distribution probability methodology to evaluate the appropriateness of the size of a loan loss reserve related to a loan collateralized by the assets of an employee stock purchase plan.

- For a large software developer, Stefan performed statistical modeling to assist in a securities class action litigation involving allegations of improper revenue recognition, reserve allocations, financial statement disclosures and other accounting irregularities

Exhibit A

- For a failed computer hardware company in defense of a 10b-5 securities litigation action, Stefan performed statistical analyses of accounting transactions, inventory and receivable reserves and the auditor's work papers in its evaluation of the allegations.

- In several Rule 10b(5) class actions, Stefan used the event study approach to calculate the value line of a security. In these cases Stefan applied complex and advanced one, two, and multi-trader models.

Non-Litigation

- For large grocery store chains, Stefan analyzed the effectiveness of a frequent shopper card program utilizing data mining techniques. He also analyzed customer data to facilitate the introduction of one-to-one marketing tools.

- For a grocery store chain, Stefan utilized econometric elasticity models to recommend pricing strategies for in-store promotions.

- For a grocery store chain, Stefan developed customer segmentation models to design segment specific marketing campaigns.

- For the American Film Marketing Association, Stefan performed an economic impact study of the influence of the independent film producers and distributors on the U.S. economy in general, and the California economy in particular.

- For a large entertainment client, Stefan developed statistical models to predict the return of video cassettes and DVDs.

- For several clients in the retail industry, Stefan developed statistical models to estimate the liability of unredeemed gift certificates.

- For a client in the restaurant business, Stefan developed statistical models to quantify the dollar amount of outstanding unredeemed gift certificates.

- For a major hotel chain, Stefan developed statistical models to forecast the redemption of frequent traveler program points for tax purposes.

- For a high profile e-commerce company, Stefan's team produced an interactive business decision tool to forecast company growth and profitability. The interactive model allows the client, through the choice of a few fundamental inputs, to measure the simultaneous impact on all cost and revenue dimensions of the company, including real estate and equity participation.

- For the Nevada Resort Association, Stefan quantified the economic impact of the gaming industry with special emphasis on the accelerated population growth in greater Las Vegas.

- For the Los Angeles Unified School District, Stefan performed an economic study about the impact of different recycling programs.

- For the Los Angeles County Department of Health Services, Stefan conducted a time and motion study to determine the time required to complete specific Medi-Cal eligibility and provider forms.

» For the Arizona Tax Research Association, Stefan developed economic models to quantify the revenue impact of a proposed change of taxation in the construction sector in Arizona.

» For a hotel property management company, Stefan analyzed customer data, and used data mining methods to develop predictive models for customer acquisition, retention, and attrition.

» For a project analyzing the extent of competition in the market segments of a pipeline company, Stefan estimated regression and Tobit-models to determine optimal bidding behavior for gas storage demand. He prepared testimony given in filings before the Federal Energy Regulatory Commission (FERC).

» For a hotel property management company, Stefan developed a demand driven yield management system.

» For a company providing self-storage space, Stefan developed a demand driven price-setting strategy utilizing own- and cross-price elasticity regression models.

» For a high-tech start-up with a unique service offering of new products, Stefan recommended product-pricing scenarios.

» For a large international conglomerate, Stefan developed customized data mining techniques for the implementation within a customer knowledge management system.

» For a large law firm, Stefan performed a comprehensive statistical analysis of Los Angeles Superior Court jury verdicts over the last decade. The project tested the hypothesis of systematic bias in particular courthouses with respect to plaintiff-win probability, length of trial, length of deliberation, and dollar amounts awarded.

Depositions

1. MRO Communications, Inc vs. American Telephone and Telegraph Company, United States District Court District of Nevada, Case. No. -5-95-903-PMP, Deposition onSeptember 26, 1996

2. Yolanda Aiello Harris, individually and on behalf of all others similarly situated; Jennifer Hopkins, individually and on behalf of others similarly situated; Shannon L. Bradley, individually and on behalf of others similarly situated, Plaintiffs, vs. CB Richard Ellis, Inc., a California corporation; CB Commercial INC., a California corporation; Defendants, Superior Court of California, County of San Diego, Case No. GIC 745044, Deposition on January 5, 2001.

3. State of Tennessee, ex rel., Douglas Sizemore, Petitioner vs. Xantus Healthplan of Tennessee, Inc., Chancery Court of Davidson County, Tennessee at Nashville, Case No 99-917-II, Deposition on October 11, 2001.

4. Howard Wright, Inc., a California corporation doing business as AppleOne Employment Services, Plaintiffs, vs. Olsen Staffing Services, Inc., a Delaware Corporation, Dagney Smith, an individual, Vicky Riechers, an individual, and Linda Shiftman, an individual, Defendants, Superior Court of the State of California for the County of Los Angeles, Case No. BC 200657, Deposition on December 7, 2001.

Exhibit A

5. Sacred Heart Medical Center, et al., Plaintiffs, -vs- Department of Social and Health Services, and Dennis Braddock, the Secretary of the Department of Social and Health Services, Defendants, Superior Court of the State of Washington in and for the County of Thurston, No. 00-2-01898-1, Deposition on January 23, 2003.

6. Patrick Bjorkquist individually and on behalf of all others similarly situated, Plaintiff, vs. Farmers Insurance Company of Washington, Defendant, in the Superior Court of the State of Washington for King County, Case No.: 02-2-11684-1 SEA, Deposition on November 3, 2003.

7. Diversified Property, a general partnership, Dora Saikhon Family Trust, and Nancy Saikhon Borrelli, an individual, Plaintiffs vs. Manufacturers Life Insurance (U.S.A.), a Michigan corporation, erroneously sued as Manufacturers Life Insurance Company, Inc., Defendants in the Superior Court of California, County of San Diego, Case No.: GIC 815128, Deposition on July 21, 2004.

8. Alan Powers, Plaintiff, vs. Laramar Group et al., Defendants in the United States District Court, Northern District of California, No. C-02-3755 SBA, Deposition on August 27, 2004.

9. Group Anesthesia Services, A Medical Group, Inc., Claimant, vs. American Medical Partners of North Carolina, Inc., etc., et al., Respondents, JAMS Arbitration, Reference No. 1100040919, Deposition on February 9, 2005.

10. Group Anesthesia Services, A Medical Group, Inc., Claimant, vs. American Medical Partners of North Carolina, Inc., etc., et al., Respondents, JAMS Arbitration, Reference No. 1100040919, Deposition on March 11, 2005.

11. Fujitsu v. Cirrus Logic et al., United States District Court, Northern District of California, San Jose Division, Case No. 02CV01627. Deposition on April 21 and 22, 2005.

12. Goldman et al. v. RadioShack Corporation, United States District Court, Eastern District of Pennsylvania, Case No. 03 CV 0032, Deposition on May 18, 2005.

13. Perez et al. v. RadioShack Corporation, United States District Court, Northern District of Illinois, Eastern Division, Case No. 02-CV-7884, Deposition on December 13, 2005.

14. United States of America ex rel. A. Scott Pogue v. American Healthcorp Inc., Diabetes Treatment Centers of America Inc., et al., United States District Court, Middle District of Tennessee at Nashville, Civil No. 3-94-0515, Deposition on May 12, 2006.

15. School Districts' Alliance v. State of Washington, United States District Court, Eastern District of Thurston, Case No. 04-2-02000-7, Deposition on July 20, 2006.

16. Boca Raton Community Hospital, Inc., a Florida not-for-profit corporation d/b/a Boca Raton Community Hospital, on behalf of itself and on behalf of Class of all others similarly situated v. Tenet Healthcare Corp., a Nevada Corporation, United States District Court, Southern District of Florida, Miami Division, Case No. 05-80183-CIV-SEITZ/MCALILEY, Deposition on July 25, 2006.

17. Boca Raton Community Hospital, Inc., a Florida not-for-profit corporation d/b/a Boca Raton Community Hospital, on behalf of itself and on behalf of Class of all others similarly situated v. Tenet Healthcare Corp., a Nevada Corporation, United States District Court, Southern District of Florida, Miami Division, Case No. 05-80183-CIV-SEITZ/MCALILEY, Deposition on October 13, 2006.

Exhibit A

18. Louise Ogborn v. McDonald's Corporation et al., Commonwealth of Kentucky 55th Judicial District, Bullitt County Circuit Court, Case No. 04-CI-00769, Deposition on October 19, 2006.

19. Elise Davis v. Kohl's Department Stores, Inc. consolidated with Rosie Grindstaff v. Kohl's Department Stores, Inc., Superior Court of the State of California for County of Los Angeles Central District, Case No. BC 327426 (lead case) consolidated with Case No. BC 341954, Deposition on April 25, 2007.

20. Norman Utley, et al., v. MCI, Inc., MCI Worldcom Communications, Inc., and MCI Network Services, Inc., formerly known as MCI Worldcom Network Services, Inc., United States District Court, Northern District of Texas, Dallas Division, Civil Action No. 3:05 - CV- 0046 - K, Deposition on May 30, 2007.

21. Ramon Moreno and Ernesto Morailo, on behalf of themselves and all others similarly situated v. Guerrero Mexican Food Products Inc., a division of Gruma Corporation; and Gruma Corporation, a Nevada Corporation, United States District Court, Central District of California, Case No. CV05-773RSWL(PLAx), Deposition on August 10, 2007.

22. Darensburg et al. v. Metropolitan Transportation Commission, U.S. District Court, Northern District of California, Case No. C-05-1597-EDL, Deposition on March 18, 2008.

23. In Re: King Pharmaceuticals, INC, Derivative Litigation, Lead Case No: BOO19077(M), The Chancery Court, Sullivan County at Bristol, Tennessee, Deposition on April 4, 2008.

24. P. Ansley et al. v. Lewis Homes of California, a California General Partnership, et al., Superior Court of the State of California, For the County of Solano, Case No. FCS02445, Deposition on April 10, 2008.

25. Personnel Plus v. Ashish Wahi et al., Superior Court of the State of California, County of Orange, Case No. 07CC08363, Deposition on August 13, 2008.

26. First Capitol Consulting Inc. v. LVX, Inc. et al., Superior Court of the State of California for the County of Los Angeles, Case No. BC378202, Deposition on October 27, 2008.

27. R. Molina et al. v. Lexmark International, Inc., Superior Court of the State of California for the County of Los Angeles, Case No. BC339177, Deposition on November 19, 2008.

28. In re National Century Financial Enterprises, Inc. Investment Litigation, No. 2:03-MD-1565-JLG-MRA (S.D. Ohio), Deposition on January 22, 2009.

29. New York City Employees' Retirement System, et al. v. Bank One, N.A., et al., Case No. 03-cv-09973 (LAK) (S.D.N.Y.), Deposition on January 22, 2009.

30. Dole Fresh Fruit International, Ltd, Hyundai Precision America, Inc., JAMS Arbitration, ADRS Case #05-1138-RTA, Deposition on December 21, 2009.

31. D. Berry, L. Hedges et al. v. Volkswagen of America, Inc. In The Circuit Court of Jackson County, Missouri, at Independence, No. 0516-CV01171 Division 2, Deposition on February 18, 2010.

Exhibit A

32. D. Aberle et al. v. Davidson Builders, Inc., et al., Superior Court of the State of California, County of Orange, Case No.: 37-2008-00083718-CU-CD-CTL, Deposition on March 24, 2010.

33. Urga, et al. v. Redlands Community Hospital, Superior Court of the State of California, County of San Bernardino, Case No. SCVSS 123769, Deposition on May 17, 2010.

34. Oberschlake, et al v. St. Joseph Hospital of Orange, et al, Superior Court of the State of California, County of Orange, Case No. 05CC00301, Deposition on August 12, 2010.

35. J. Morrison v. The Vons Companies, Inc., Superior Court of State of California, County of San Diego, Case No. 37-2009-00081026-CU-BT-CTL, Deposition on December 7, 2010

36. R. Pate, et al. v. Children's Hospital of Orange County, Superior Court of California, County of Orange, Case No. 05CC00303, Deposition on April 13, 2011.

37. M. St. Croix, et al. v. Cedar Fair, L.P., et al., Superior Court of California, County of Orange, Case No. 30-2008-0214500, Deposition on August 22, 2011.

38. Steven Domalewski, a minor v. Hillerich and Bradsby Co., et al., Superior Court of New Jersey, Passaic County, Docket No.: PAS-L-2119-08, Deposition on January 5, 2012.

39. Cathleen McDonough, et al., v. Horizon Blue Cross/Blue Shield of New Jersey, United States District Court, District of New Jersey, Civil Action No. 09-cv-00571-(SRC) (PC), Deposition on January 10, 2012.

40. Daniel Ordonez, et al., v. Radio Shack, United States District Court, Central District of California, Case No. CV 10-07060 CAS (JCGx), Deposition on October 24, 2012.

41. Ameritox, Ltd., v. Millennium Laboratories, Inc., United States District Court, Middle District of Florida, Case No. 8:11-cv-00775-SCB-TBM, Deposition on December 20, 2013.

42. United States of America, ex rel. Glenda Martin v. Life Care Centers of America, Inc., United States District Court Eastern District of Tennessee at Chattanooga, Civ. Action No. 1:08-CV-251, Deposition on January 15, 2014.

43. United States of America, ex rel. Tammie Taylor v. Life Care Centers of America, Inc., United States District Court Eastern District of Tennessee at Chattanooga, Civ. Action No. 1:12-CV-64, Deposition on January 15, 2014.

44. Darren Smith, et al., v. Panera Bread Company, Superior Court of California, County of San Diego, Case No. 37-201-00084077 CU-BT-CTL, Deposition on April 30, 2014.

45. Joseph Hummel et al., v. Castle Principles, LLC et al., Superior Court of California, County of Santa Clara, Case No. 112CV223170, Deposition on June 19, 2014.

46. Sherman Way Oil, Inc. (Bijan Pouldar), American Pacific Enterprises Group (Sherwin Louie), Bahman Kohanteb, Hamid Kalhor, Claimants, Vs. Circle K Stores, Inc., Respondent, Alternative Dispute Resolution Case No's 13-7103-DSC through 13-7106-DSC, Deposition on September 25, 2014.

Exhibit A

47. In re: ExxonMobil Oil Corporation, et al., Southern California Bulk Sale Litigation, Case No. CV12-04689-PA (VBKx), Deposition on September 25, 2014.

48. Oracle Wage and Hour Cases, Raghunandam Matam et al., v. Oracle Corporation, Superior Court of California, County of Alameda, No. RG-09480164, Deposition on October 21, 2014.

49. G. Taylor et al. v. Shippers Transport Express, Inc., et al., United States District Court, Central District of California, Case No.: CV13-02092-BRO (PLAx), Deposition on October 24, 2014.

50. Denise Mays et al. v. Children's Hospital of Los Angeles, Superior Court of California, County of Los Angeles, Case No. BC477830, Deposition on March 17, 2015.

51. Direct General Insurance Company v. Indian Harbor Insurance Company et al., United States District Court, Southern District of Florida, Miami Division, Case No. 14-20050-CIV-Cooke/Torres, Deposition on March 27, 2015.

52. Dennis Dickman v. Gerdau Reinforcing Steel, et al., Superior Court of California, County of San Bernardino, Case No. CIV-DS-1406231, Deposition on July 7, 2015.

53. Fred Devries, et al. v. Morgan Stanley & Co. LLC, et al., United States District Court, Southern District of Florida, Case No. 9:12-cv-81223-KAM, Deposition on July 31, 2015.

54. Dennis Dickman v. Gerdau Reinforcing Steel, et al., Superior Court of California, County of San Bernardino, Case No. CIV-DS-1406231, Deposition on September 11, 2015

55. Leah Davis, and Amy Krajec, et al. v. St. Jude Hospital, Superior Court of California, County of Orange, Case No. 30-2012-00602596-CU-OE-CXC, Deposition on January 19, 2016.

56. In re MyFord Touch Consumer Litigation, Whalen, et al. vs. Ford Motor Company, United States District Court Northern District of California San Francisco Division, Case No. 13-cv-3072-EMC, Deposition on February 23, 2016.

57. United States of America, ex rel. Glenda Martin v. Life Care Centers of America, Inc., United States District Court Eastern District of Tennessee at Chattanooga, Civ. Action No. 1:08-CV-251 & United States of America, ex rel. Tammie Taylor v. Life Care Centers of America, Inc., United States District Court Eastern District of Tennessee at Chattanooga, Civ. Action No. 1:12-CV-64, Deposition on March 4, 2016.

58. The United States of America and the State of Florida ex rel. Angela Ruckh v. CMC II LLC, United States District court for the Middle District of Florida Tampa Division, Civil Action No. 8:11 CV 1303 SDM-TBM, Deposition on March 16, 2016.

59. Bertha Sanchez, et al. v. St. Mary Medical Center, et al., Superior Court of the State of California for the County of San Bernardino, Case No. CIVDS 1304898, Deposition on July 13, 2016.

60. Christian Juarez, et al v. Dignity Health, a California corporation, et al., Superior Court of the State of California, County of Los Angeles, Central Civil West District, Case No. BC550950, Deposition on August 15, 2016.

Exhibit A

61. In Re Dial Complete Marketing and Sales Practices Litigation, United States District Court, District of New Hampshire, Case No. 11-md-2263-SM (MDL Docket No. 2263), Deposition on August 30, 2016.

62. In Re: Myford Touch Consumer Litigation, United States District Court, Northern District of California, San Francisco Division, Case No. 13-cv-3072-EMC, Deposition on September 16, 2016.

63. United Healthcare Insurance Company v. Lincare Inc., Case Improvement Plus of Texas Insurance Company: Care Improvement Plus South Central Insurance Company: Care Improvement Plus of Maryland, Inc. v. Lincare Inc., In an Arbitration Before the American Arbitration Association, Case No. 01-15-0003-4095, Deposition on December 21, 2016.

64. The Moses H. Cone Memorial Hospital Operating Corporation d/b/a Cone Health v. Springfield Service Corporation d/b/a SPI Healthcare, United States District Court for the Middle District of North Carolina, Civil Action No. 1:13-cv-651, Deposition on January 17, 2017.

65. The People of the State of California, acting by and through Orange County District Attorney Tony Rackauckas v. General Motors LLC, Superior Court of the State of California in and for the County of Orange Complex Litigation Division, Case No. 30-2014-00731038-CU-BT-CX, Deposition on April 20 and 21, 2017.

66. In Re: Emerson Electric Co. Wet/Dry Vac Marketing and Sales Litigation, United States District Court for the Eastern District of Missouri, MDL No. 2382, Civil Action No. 4:12-md-2382-HEA, Deposition on May 17, 2017.

67. The People of the State of California, acting by and through Orange County District Attorney Tony Rackauckas v. General Motors LLC, Superior Court of the State of California in and for the County of Orange Complex Litigation Division, Case No. 30-2014-00731038-CU-BT-CX, Rebuttal Deposition on June 13, 2017.

68. Clayton Dezan, et al. v. Dignity Health, a California Corporation; Community Hospital of San Bernardino, et al, Superior Court of The State of California for the County of San Bernardino, Case No. CIVDS1516658, Deposition on August 22, 2017.

69. Millennium Health, LLC v. Blue Shield of California, Counterclaim, Blue Shields of California v. Millennium Health, LLC, American Arbitration Association, Case No. 01-15-0005-5926, Deposition on August 24, 2017.

70. Matthew Townsend, et al. v. Monster Beverage Corporation and Monster Energy Company, United States District Court Central District of California, Case No. 5:12-cv-02188 VAP (KKx), Deposition on September 20, 2017.

71. Welltower Inc., v. Scott M. Brinker, In the Court of Common Pleas Lucas County, Ohio, Case No. CI-17-2692, Deposition on October 4th, 2017.

72. In Re Seagate Technology LLC Litigation, United States District Court, Northern District of California San Jose Division, Case No. 5:16-cv00523-RMW, Deposition on December 12th, 2017.

Exhibit A

73. Joanne Hart and Sandra Bueno v. BHH, LLC d/b/a Bell + Howell and Van Hauser LLC, United States District Court for the Southern District of New York, Case No. 1:15-CV-04804-WHP, Deposition on January 26th, 2018.

74. Thomas Davidson, et al v. Apple Inc., United States District Court Northern District of California San Jose Division, Case No. 5:16-cv-04942-LHK, Deposition on January 29, 2018.

75. In Re: General Motors, LLC Ignition Switch Litigation, United States District Court Southern District Of New York, Case No. 14-MD-2543 (JMF), Deposition on February 6th and 7th, 2018.

76. Bertha Sanchez, et al. v. St. Mary Medical Center, Superior Court of the State of California for the County of San Bernardino, Case No. CIVDS 1304898, Deposition on March 29, 2018.

77. The State of Texas v. Xerox Corporation, et al., The District Court 53rd Judicial District Travis County, Texas, Cause No. D-1-GV-14-000581, Deposition on April 12, 2018.

78. Wendy Manemeit, et al. v. Gerber Products Co., The United States District Court for the Eastern District of New York, No. 2:17-cv00093, Deposition on May 10, 2018.

79. Theodore Broomfield, et al., v. Craft Brew Alliance, Inc., et al., United Stated District Court, Northern District of California, San Jose Division, Case No. 5:17-cv-01027-BLF, Deposition on June 20, 2018.

80. In RE: General Motors, LLC Ignition Switch Litigation, United States District Court, Southern District of New York, Case No. 14-MD-2543 (JMF), Deposition on July 5, 2018 and July 6, 2018.

81. Brendan C. Haney v. Costa Del Mar Inc., In The Circuit Court, Fourth Judicial Circuit, in and for Duval County, Florida, Case No. 16-2017-CA-004797-XXXX-MA, Deposition on November 27, 2018.

82. Patricia Weeks, et al. v. Google LLC, United States District Court Northern District of California San Jose Division, Case No. 5:18-cv-00801-NC, Deposition on December 21, 2018.

83. Frederick Sharp v. Wolf Appliance, Inc., The United States District court for the Eastern District of New York, Civil Action No. 1:18-CV-01723-JS-GRB, Deposition on January 3, 2019.

84. Kellie Loeb, et al. v. Champion Petfoods USA Inc. and Champion Petfoods LP, United States District Court Eastern District of Wisconsin Milwaukee Division, Case No. 2:18-cv-00484-JPS, Deposition on January 8, 2019.

85. Fremont Emergency Services (Mandavia), Ltd v. Rocky Mountain Hospital and Medical Service, Inc. d/b/a Anthem Blue Cross and Blue Shield and HMO Colorado, Inc. d/b/a HMO Nevada, In the Judicial Arbitration and Mediation Services, JAMS No. 12600004507, Deposition on January 25, 2019.

86. United States of America ex rel. Lori Morsell, v. Symantec Corporation, United States District Court for The District of Columbia, C.A. No. 12-0800 (RC), Deposition on February 28, 2019.

87. Jeff Young v. Cree, Inc., United States District Court Northern District of California Oakland Division, Case No. 4:17-cv-06252-YGR, Deposition on March 12, 2019.

Exhibit A

88. Raymond Foreman et. al. v. Shlomo Rechnitz et. al., JAMS Judicial Arbitration, No. 120052954, Deposition on March 21, 2019.

89. Thomas Davidson, et al v. Apple Inc., United States District Court Northern District of California San Jose Division, Case No. 5:16-cv-04942-LHK, Deposition on March 27, 2019.

90. Sepehr Forghani, as an aggrieved employee pursuant to the Private Attorney General Act ("PAGA") v. Whole Foods Market California, Inc., a California Corporation; Mrs. Gooch's Natural Food Markets, Inc., a California Corporation, Superior Court of The state of California, County of Los Angeles, Case No. BC637964, Deposition on April 16, 2019.

91. Weiner v. Ocwen Financial Corporation, United States District Court, Eastern District of California, Case No. 2:14-cv-02597-MCE-DB, Deposition on April 19, 2019.

92. Dennis MacDougall, Ray Seow, Prabhanjan Kavuri, Richard Frick, Joseph Ryan Parker, and Bryan Lentz v. American Honda Motor Co., Inc., and Honda North America, Inc., United States District Court, Central District of California, Case No. 8:17-cv-01079, Deposition on April 23, 2019.

93. Yan Mei Zheng-Lawson v. Toyota Motor Corporation, Toyota Motor North America, Inc., and Toyota Motor Sales U.S.A., Inc., United States District Court, Northern District of California, Case No. 17-CV-06591-BLF, Deposition on June 28, 2019.

94. Shaya Eidelman v. The Sun Products Corporation and Costco Wholesale Corporation, United States District Court, For The Southern District of New York, Case No. 7:16-cv-03914-NSR, Deposition on July 22, 2019.

95. Dara Fresco and Canadian Imperial Bank of Commerce, Ontario Superior Court of Justice, Court File No. 07-CV-334113CP, Deposition on October 3, 2019.

96. Inteliquent, Inc. v. Free Conferencing Corporation; HDPSTN, LLC d/b/a HD Tandem; Wide Voice, LLC; Yakfree, LLC; and Carrierx, LLC, United States District Court for the Northern District of Illinois Eastern Division, Case No. 1:16-CV-06976, Deposition on October 18, 2019.

97. Elaine Rice and Alex Kukich v. Electrolux Home Products, Inc., United States District Court for The Middle District of Pennsylvania, Case No. 15-cv-00371, Deposition on December 13, 2019.

98. Richard Sotelo, et al. v. Rawlings Sporting Goods Company, Inc., United Stated District Court Central district of California, Case No. 2:18-cv-09166-GW-MAA, Deposition on February 14, 2020.

99. Kieran O'Hara, et al. v. Diageo Beer Company USA & Diageo North America, Inc., United States District Court District of Massachusetts, Case No. 1:15-cv-14139-MLW, Deposition on February 20, 2020.

100. Ira Kleiman, as the personal representative of the Estate of David Kleiman, and W&K Info Defense Research, LLC v. Craig Wright, United States District Court, Southern District of Florida, Case No. 9:18-cv-80176-BB/BR, Deposition on April 22, 2020.

101. Richard Ferrari, et al. v. Vitamin Shoppe, Inc., The United States District Court for the District of Massachusetts, Civil Action No. 1:17-cv-10475-GAO, Deposition on July 23, 2020.

Exhibit A

102. Jennifer Song and Scott Wertkin, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP, United States District Court District of Minnesota, Case No. 18-cv-03205-PJS-KMM, Deposition on December 02, 2020.

103. Michael Maeda and Rick Smith, et al. v. Kennedy Endeavors, Inc., United states District Court for The District of Hawaii, Case No. 18-00459 JAO-WRP, Deposition on December 11, 2020.

104. Robert Van Bebber, et al. v. Dignity Health, United States District Court Eastern District of California, Case No. 1:19-cv-00264-DAD-EPG, Deposition on December 16, 2020.

105. Humana, Inc. v. Life Care Centers of America, Inc., American Arbitration Association, Case No. 01-17-0007-1697, Deposition on December 22, 2020.

106. Youssif Kamal, et al. v. Eden Creamery, LLC., et al., United States District Court Southern District of California, Case No. 18-cv-1298 BAS AGS, Deposition on December 29, 2020.

Testimony

1. State of Tennessee, ex rel., Douglas Sizemore, Petitioner vs. Xantus Healthplan of Tennessee, Inc., Chancery Court of Davidson County, Tennessee at Nashville, Case No 99-917-II, Trial Testimony on October 16, 2001.

2. State of Tennessee, ex rel., Douglas Sizemore, Petitioner vs. Xantus Healthplan of Tennessee, Inc., Chancery Court of Davidson County, Tennessee at Nashville, Case No 99-917-II, Rebuttal Testimony on October 26, 2001.

3. Howard Wright, Inc., a California corporation doing business as AppleOne Employment Services, Plaintiffs, vs. Olsen Staffing Services, Inc., a Delaware Corporation, Dagney Smith, an individual, Vicky Riechers, an individual, and Linda Shiftman, an individual, Defendants, Superior Court of the State of California for the County of Los Angeles, Case No. BC 200657, Trial Testimony on March 4, 2002.

4. Columbia/HCA Healthcare Corporation - Billing Practices Litigation, United States District Court, Middle District of Tennessee, Nashville Division, Case No. 3-98-MDL-1227 on June 28, 2002.

5. Sacred Heart Medical Center, et al., Plaintiffs v. Department of Social and Health Services, and Dennis Braddock, the Secretary of the Department of Social and Health Services, Defendants, Superior Court of the State of Washington in and for the County of Thurston, No. 00-2-01898-1, Testimony in Liability Trial on April 14, 2003.

6. Diversified Property, a general partnership, Dora Saikhon Family Trust, and Nancy Saikhon Borrelli, an individual, Plaintiffs v. Manufacturers Life Insurance (U.S.A.), a Michigan corporation, erroneously sued as Manufacturers Life Insurance Company, Inc., Defendants in the Superior Court of California, County of San Diego, Case No.: GIC 815128, Trial Testimony on October 25, 2004.

Exhibit A

7. Bridgestone/Firestone North American Tire v. Sompo Japan Ins. Co. of America, United States District Court for the Middle District of Tennessee Nashville Division Civil Action NO. 3-02-1117 on March 7, 2005

8. Group Anesthesia Services, A Medical Group, Inc., Claimant, vs. American Medical Partners of North Carolina, Inc., etc., et al., Respondents, JAMS Arbitration, Reference No. 1100040919, Arbitration Testimony on March 23, 2005.

9. Goldman et al. v. RadioShack Corporation, United States District Court, Eastern District of Pennsylvania, Case No. 03 CV 0032, Testimony in Liability Trial on June 28 and 29, 2005.

10. Goldman et al. v. RadioShack Corporation, United States District Court, Eastern District of Pennsylvania, Case No. 03 CV 0032, Rebuttal Testimony in Liability Trial on July 5, 2005.

11. Mauna Loa Vacation Ownership LLP v. Accelerated Assets, LLP. United States District Court, District of Arizona, Case No. CIV 03-0846 PCT DGC. Trial Testimony on February 22, 2006.

12. School Districts' Alliance v. State of Washington, United States District Court, Eastern District of Thurston, Case No. 04-2-02000-7, Trial Testimony on November 13, 2006.

13. In the Matter of Premier Medical Group, PC, Appellant – Department of Health and Human Services, Office of Medicare Hearings and Appeals, Southern Field Office, ALJ Appeal No. 1-221579701, Medicare Appeal No. 1-18761858, Provider No. 3706654, AR No. 9406352171039, Judge Zaring Robertson, US Administrative Law Judge, Testimony on April 1, 2008.

14. Darensburg et al. v. Metropolitan Transportation Commission, U.S. District Court, Northern District of California, Case No. C-05-1597-EDL, Trial Testimony on October 9, 2008.

15. R. Molina et al. v. Lexmark International, Inc., Superior Court of the State of California for the County of Los Angeles, Case No. BC339177, Trial Testimony on October 22 and 26, 2009.

16. Dole Fresh Fruit International, Ltd, Hyundai Precision America, Inc., ADRS Case #05-1138-RTA, Trial Testimony on February 19, 2010.

17. In the matter of University of Tennessee Cancer Institute, ALJ Appeal No. 1-446 575 318, Office of Medicare Hearings & Appeals, Judge Z. Robertson, US Administrative Law Judge, Testimony on April 20, 2010.

18. Urga, et al. v. Redlands Community Hospital, Superior Court of the State of California, County of San Bernardino, Case No. SCVSS 123769, Trial Testimony on July 20, 2010.

19. Marine Engineers' Beneficial Association v. Department of Transportation, Ferries Division Federal Mediation & Conciliation Service Cause No. 110105-52404-6 AGO Matter No. 10499471, July 19, 2011.

20. Richard Robinson v. County of Los Angeles, et. al., United States District Court of California, Central District, Case No. CV06-2409 GAF (VBKx), Trial Testimony on December 1, 2011.

21. In the matter of American Home Patient, ALJ Hearing, Appeal No. 1-982137828, Office of Medicare Hearings & Appeals, Miami Office Southern Field Division, Testimony on October 29, 2012.

Exhibit A

22. In the matter of American Home Patient, ALJ Hearing, Appeal No. 1-924297238, Office of Medicare Hearings & Appeals, Irvine Office Western Field Division, Hearing Testimony on February 28, 2013.

23. TaylorMade Golf Company Challenge to Callaway Golf Company's Final Response, National Advertising Division, New York, Testimony on March 13, 2013.

24. United States of America, ex rel. Tammie Taylor v. Life Care Centers of America, Inc., United States District Court Eastern District of Tennessee at Chattanooga, Civ. Action No. 1:12-CV-64, Testimony on May 13, 2014.

25. United States of America v. Houshang Pavehzadeh, United States District Court for the Central District of California, No. CR 13-0320-R, Testimony on May 19, 2014.

26. Sherman Way Oil, Inc. (Bijan Pouldar), American Pacific Enterprises Group (Sherwin Louie), Bahman Kohanteb, Hamid Kalhor, Claimants, Vs. Circle K Stores, Inc., Respondent, Alternative Dispute Resolution Case No's 13-7103-DSC through 13-7106-DSC, Arbitration Testimony on October 10, 2014.

27. Heidi's Children Dental Center (DC14-0813-204-LM) vs. Denti-Cal, Testimony at Administrative Law Judge Hearing, Judge Lewis Munoz, in Los Angeles on November 5, 2014.

28. AdvanceMed Audit of Altercare of Wadsworth, Medicare Appeal, Medicare Appeal No. 1-912446681, Bertha Sanchez, et al. v. St. Mary Medical Center, et al., Superior Court of the State of California for the County of San Bernardino, Case No. CIVDS 1304898, Certification Hearing Testimony on October 21, 2016.

29. Michael Bozsik v. Livingston International Inc., Ontario Superior Court of Justice, Court File No. 5270/14, Cross Examination Testimony on May 12, 2016.

30. Bertha Sanchez, et al. v. St. Mary Medical Center, et al., Superior Court of the State of California for the County of San Bernardino, Case No. CIVDS 1304898, Certification Hearing Testimony on October 21, 2016.

31. In Re Dial Complete Marketing and Sales Practice Litigation, United States District Court, District of New Hampshire, Case No. 11-md-2263-SM (MDL Docket No. 2263), Hearing Testimony on November 16, 2016.

32. United Healthcare Insurance Company v. Lincare Inc., Case Improvement Plus of Texas Insurance Company: Care Improvement Plus South Central Insurance Company: Care Improvement Plus of Maryland, Inc. v. Lincare Inc., In An Arbitration Before the American Arbitration Association, Case No. 01-15-0003-4095, Arbitration Testimony on February 6, 2017.

33. The United States of America and The State of Florida ex rel. Angela Ruckh v. CMC II, LLC, United States District Court for the Middle District of Florida Tampa Division, Civil Action No. 8:11 CV 1303 SDM-TBM, Trial Testimony on February 8, 2017.

34. Federal Government of Germany v. A Consortium of Publicly Traded Companies in an arbitration under the laws of Germany, Arbitration Testimony on March 21 and 22, 2017.

Exhibit A

35. In Re Determination of Royalty Rates and Terms for Transmission of Sound Recordings by Satellite Radio and "Preexisting" Subscription Services (SDARS III), United States Copyright Royalty Judges The Library of Congress Washington, D.C., Docket No. 16-CRB-0001-SR/PSSR (2018-2022), Trial Testimony on May 9, 2017.

36. ZPIC Audit Appeal of Providence Health System Southern California, Office of Medicare Hearings and Appeals, OMHA Appeal Number 1-1823418684, Hearing Testimony on October 16, 2017.

37. New Beacon Healthcare Group, LLC, Medicare Appeal Number 1-1269788965, Hearing Testimony on December 1, 2017.

38. Arriva Medical LLC, Office of Medicare Hearing and Appeals, ALJ appeal No. 1-1874414073, Post Pre-Hearing Conference Testimony on March 23, 2018.

39. Christopher Corbin, et al. v. Indus Investment, Inc., Superior Court of the State of California for the County of Los Angeles, Case No. BC565881, Trial testimony on April 6, 2018.

40. Toll Collect GmbH v. Federal Republic of Germany, Hearing Testimony on April 16, 2018.

41. Arriva Medical, LLC, ALJ Appeal No: 1-1945149644 (Sub-Universe August 2013), Appellant's Hearing Testimony on April 18, 2018.

42. Arriva Medical, LLC, ALJ Appeal No: 1-2049326076 (Sub-Universe September 2013), Telephonic Hearing Testimony on September 11, 2018.

43. Arriva Medical, LLC, ALJ Appeal No: 1-1572478459 (Sub-Universe January to June 2013), Telephonic Hearing Testimony on September 20, 2018.

44. Brendan C. Haney v. Costa Del Mar Inc., In The Circuit Court, Fourth Judicial Circuit, in and for Duval County, Florida, Case No. 16-2017-CA-004797-XXXX-MA, Hearing Testimony on December 5, 2018.

45. Arriva Medical, LLC, ALJ Appeal Number: 1-2159094909, Telephonic Hearing Testimony on January 23, 2019.

46. Bay Hospital, Inc. d/b/a Gulf Regional Medical Center, et. al., v. WellCare of Florida, Inc. f/k/a WellCare HMO, Inc., WellCare of Georgia, Inc., and WellCare of South Carolina, American Arbitration Association, Case No. 01-19-003-9745, Telephonic Arbitration Hearing on June 10, 2020.

Speaking Engagements

1. Global Brand protection: Challenges and Opportunities, December 8, 2015.

2. Washington Health Care Conference, May 2016.

3. 4th Advanced Forum on False Claims & Qui Tam Enforcement Conference, January 2017.

4. False Claims Act/Qui Tam Whistleblowers Litigation: Hot Buttons in 2017 Live Webcast, March 2017.
5. Fraud & Abuse: Part II – Understanding Statistical Sampling, Lrive Webcast, September 2017.
6. American Hospital Association Chief Compliance Officers Roundtable: Defending against audits using statistical sampling and extrapolation, April 2018.
7. How to Effectively Use Statistical Sampling in Class Action Litigation: Tips and Strategies in 2019 Live Webcast, December 2018.
8. Statistical Sampling in Healthcare Audits and Investigations, HCCA's 23rd Annual Compliance Institute, April 9, 2019.
9. False Claims Act: A Look Back and 2021 Expectations LIVE Webcast, The Knowledge Group Webinar, December 03, 2020.

Publications

Boedeker, Stefan and Goetz Trenkler (2001) - "A Comparison of the Ridge and Iteration Estimator" - in: Econometric Studies: A Festschrift in Honour of Joachim Frohn (ed. by Ralph Friedmann, Lothar Knueppel, and Helmut Luetkepohl), New Brunswick

Professional and Business History

» Berkeley Research Group, 2010 - Present, Managing Director
» Resolution Economics, 2008 - 2010, Partner
» Alvarez & Marsal, 2007 - 2008, Managing Director
» LECG LLC, 2005 - 2007, Director
» Navigant Consulting Inc., 2004 -2005, Managing Director in Litigation and Investigation Practice
» Deloitte & Touche LLP, 2003 - 2004, Leader of the Economic and Statistical Consulting Practice in the West Region
» PricewaterhouseCoopers LLP, 2002 - 2003, Leader of the Litigation Consulting Group in Los Angeles, Leader of the Economic and Statistical Consulting Practice in the West Region
» Andersen LLP, 1992 - 2002, Partner (since 2000), last position held: Director of Economic and Statistical Consulting practice in the Pacific Region
» University of California, San Diego, 1989 - 1991, Teaching Assistant, Department of Economics
» German Government, 1986 - 1989, Economic Research Assistant

Exhibit B

List of Documents Relied Upon

Case Documents

1. Third Amended Class Action Complaint, Hawes et al. v. Macy's, Inc. United States District Court For The Southern District of Ohio, Case No. 1:17-cv-00754, filed August 12, 2019.
2. Exhibits B through D to Amended Class Action Complaint, Hawes et al. v. Macy's, Inc. United States District Court For The Southern District of Ohio, Case No. 1:17-cv-00754, filed October 23, 2018.

Bates Documents

3. MACYS_0000902-914.xlsx
4. MACYS_374-391 combined item spreadsheet.xlsx

Other Documents Received

5. Recreated MWSI Sheets Spreadsheet.xlsx

*Other documents considered in forming my opinon, including publicly available journal articles, books, and websites are referenced in the report and footnotes.